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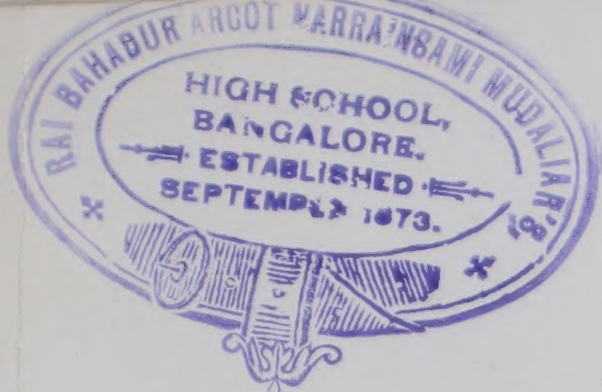
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THE BRITISH EMPIRE

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BRITISH EMPIRE

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“It is to me a standing marvel how all these countries, for all these centuries, to have only the name of . . . hills and rivers on their lips. . . . and never a line of conception of them in their mind's sight.” JOHN RUSKIN.

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ADAM AND CHARLES BLACK

1910

First Edition published October 1906

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PREFACE TO FIRST EDITION

THE success which has attended the publication of the *Descriptive Geographies of the World* (Black) has clearly demonstrated the educational value of using original authorities in the teaching of geography. The present volume has been prepared in response to repeated inquiries from teachers for class use either as a text-book or as a reader. The extracts are chiefly selected from the six volumes of the *Descriptive Geographies of the World* (Black), with the addition of a few additional passages bearing chiefly on occupations. The editor has throughout kept in view the requirements of pupils. Some of the more difficult extracts have been slightly condensed, and occasionally somewhat simplified in language. The subject-matter has been arranged in what is believed to be a true educational order, proceeding as far as possible from the known to the unknown. It is hoped that this arrangement will bring out such geographical unity as is possessed by our vast Empire, and that it will also facilitate the comparison of similar regions. The present volume will thus be found specially useful by the growing number of teachers who adopt the regional method, while it presents no difficulty to those who prefer to retain the more conventional order. The Introduction prefixed to the other volumes of

the series, which was somewhat difficult for junior pupils, is replaced by a running commentary which links the extracts together and calls attention to the most important geographical points. The bibliography has been omitted, and the extra space thus obtained has been utilised to increase the number of illustrations.

The editor desires to thank all those authors and publishers who have kindly permitted the use of copyright works, and her husband—Dr. A. J. Herbertson, Reader in Geography in the University of Oxford,—who has revised the proofs and offered many valuable criticisms.

BIRDLP, GLÖS.,
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DESCRIPTIVE GEOGRAPHY OF THE BRITISH EMPIRE

CANADA AND NEWFOUNDLAND

The Dominion of Canada (3,460,000 sq. miles) lies north of the Great Lakes and of a line drawn from the northern shores of Lake Superior to Vancouver in British Columbia. It does not include Alaska in the north-west, which belongs to the United States.

In the Arctic north Canada is a bleak, treeless region, frozen for many months of the year. The fur-trappers give this the name of the Barren Grounds, but geographers call all such regions tundras.

North American Tundra

THE word tundra is used in Siberia to designate the vast, treeless, moss-covered plains bordering the Arctic Ocean. It has been adopted for similar regions on the northern shores of America.

During the summer the tundra is a swampy, moderately level country covered with mosses, lichens, and a great number of small and exceedingly beautiful flowering plants, together with rushes and ferns. The most conspicuous plants are dwarf willows, which attain a height of, perhaps, two feet. The soil beneath the luxuriant carpet vegetation is a black humus, and, at a depth exceeding a foot or so, is always frozen.

On the surface of the tundra there are many lakelets and ponds, surrounded by banks of moss, which grows even more luxuriantly than on the adjacent area. This dense tundra vegetation extends up the sides of the hills that occasionally break the monotony of the plain, and is very similar to the deep mat of living plants decked with Alpine flowers which add such an indescribable charm to the mountains of Southern Alaska at the upper limit of timber growth. The dense vegetation forming the tundra changes by imperceptible gradations to dead and decaying matter a few inches below the surface, and finally becomes a black, peaty humus, which retains but few indications of its vegetable origin. The accumulation of this layer depends on the fact that vegetation grow luxuriantly at the surface, while it dies and partially decays below, but is frozen before complete decomposition takes place. This process is similar to that which occurs in the formation of peat bogs, except that a great variety of plants take the place of sphagnum moss, and the subsoil is always frozen.

PROF. I. C. RUSSELL.—*Scottish Geographical Magazine*, August 1894.

By permission of the Royal Scottish Geographical Society.

Spring in the Tundra

Nothing more dismal than the winter aspect of these wastes can be imagined. The northern forests are silent enough in winter-time, but the silence of the Barren Grounds is far more profound. With the exception of the shriek of the snow-owl, or the yelping of a fox emerged from his lair, there is no sound of life during seven or eight or nine months of winter on the Barren Grounds, unless the traveller is able to hear the rushing sound—some can hear it, others cannot—of the shifting northern lights.

In May, however, when the snows melt and the swamps begin to thaw, the Barren Grounds become full of life.

The sky is literally darkened with enormous flights of wild-fowl, whom instinct brings from the southern reaches of the Mississippi and its tributaries to these sub-Arctic wildernesses, where they find an abundance of food, and at the same time build their nests and rear their young in safety.

The snow-geese are the first to arrive; next come the common and eider-duck; after them the great northern black-and-red-throated divers; and last of all, the pin-tail and the long-tail ducks. Eagles and hawks prey on these migratory hosts; troops of ptarmigan seek food among the stunted willows on the shores of the lakes and sloughs; and in sunny weather the snow-bunting's song is heard.

E. B. OSBORN.—*Greater Canada*. Chatto and Windus.

By permission of Mr. E. B. Osborn and Messrs. Chatto and Windus.

The scanty inhabitants are either Indians, an inland people, or Eskimo, a coastal people. Both live by hunting and fishing.

Hospitality of the Eskimo

When we approached any of the villages the women always turned out and sat on the roofs of their turf houses to get a better view of the strange boat, while the men came down to show us the best landing and help us to run the canoe up quickly beyond the reach of surf. They always lent us poles for setting up the lodge, and gave us firewood when there was no drift timber near. They have to make long expeditions up the small rivers for poles, as they require a good many for setting their fish-traps in deep water, and none of a suitable length grow anywhere near the coast. The inside of their dwellings smelt too much of rancid seal oil and general filth to be comfortable quarters at this time of year, although they would make a snug enough shelter from the savage winds that sweep this dreary coast in winter.

The natives were liberal, too, with their salmon, and would always give us a good supply for a leaf of most villainous tobacco. Some of their freshly-smoked salmon are really very good, but most of them are spoilt to a white man's taste by being tied up tight in bales before they are properly dried, and allowed to turn sour. Once I objected to some fish as not being fresh enough, and made signs to that effect, chiefly with the aid of my nose. The old man went away and brought some more which were far worse. On these being rejected, he beckoned me to come with him, and, leading me to a swampy spot, scraped away the loose earth with a fish-spear and lifted a board which covered the top of a pit. The pit was filled to the brim with a seething mass of rotten salmon. I began to realise he had misunderstood my sign language, and thought I was objecting to his fish because they were too fresh. The salmon pit, I afterwards found, was a common institution in every village, its contents being usually reserved for winter use.

W. W. PIKE.—*Through the Sub-Arctic Forest.* Arnold.

By permission of Mr. Edward Arnold.

In this tundra region, which includes a part of the Yukon basin, the people prefer to make their homes either by the sea or on the shores of a river. The latter is doubly useful, serving both as a road and as a source of food.

Settlement and Rivers in the Far North

When passing up or down the Yukon during the busiest season—that is, the brief summer—the traveller would form an incorrect estimate of the population were he to base it on the number of those living on the banks of the river, for he would find, were he to make a short excursion into the almost impenetrable forests and over the hills and mountains, that only along the river exist the conditions necessary for life throughout the year.

The small rivulets of the interior, and the vast swampy plains, covered with snow for seven or eight months in the year, are only visited by the trapper when the skins of the marten, mink, and musk-rat are in their prime. Along the upper reaches of the Yukon and the Tanana the inhabitants are less dependent upon the river, and fish and game are abundant.

A. BEGG.—*Scottish Geographical Magazine*, November 1896.

By permission of the Royal Scottish Geographical Society.

This tundra passes gradually into thin forests on the south.

On the Forest Margin

The boundary line between the "Barren Grounds" (or "The Barrens," as they are generally called by the fur-traders) and the forest region of Canada is not distinct. The one merges into the other almost imperceptibly; and just as portions of the first are treeless, *e.g.* much of the south shore of the Hudson's Bay, so occasional areas of the latter, *e.g.* river valleys, the margins of lakes, and sheltered spots generally, are wooded to some extent. The influence of the local winds is a most important factor in the matter. Thus the northerly winds which prevail throughout the summer months in Baffin's Bay and Davis's Straits, and fill the north-eastern part of the American archipelago with rank Arctic ice, are the cause of the very low temperatures there and of the lack of timber; while, on the other hand, the southerly summer winds of the Mackenzie valley help to extend the forest of that favoured region nearly as far as the very shores of the Arctic Ocean. Athabasca and Saskatchewan owe their possession of fine timber-limits to the prevalence of the warm western wind or "chinook,"¹ which blows out of the Pacific across the mountains; whereas Keewatin—the land "at the back of the north wind"—has little good timber, because

¹ For the cause of the chinook see *Climate of Canada*, p. 13.

the chinook never reaches there, and throughout the settled north-west the difference between the timber on the south or western and the northern or eastern slopes of rising ground is always very marked.

Long before the treeless wastes are reached the forests cease to be forests except by courtesy. The trees—black and white spruce, the Canadian larch, and the grey pine, willow, alder, etc.—have an appearance of youth; so that the traveller would hardly suppose them to be more than a few years old at first sight. On the shores of the Great Bear Lake four centuries are necessary for the growth of a trunk not as thick as a man's wrist. The explanation of this fact is that the summers are so short that, though fresh shoots are brought forth each season, there is no time for the formation of new wood. The farther north the more lamentably decrepit becomes the appearance of these woodlands, until presently their sordidness is veiled by thick growths of grey lichens—the “caribou moss,” as it is called—which clothe the trunks and hang down from the shrivelled boughs. And still farther north the trees become mere stunted stems, set with blighted buds that have never been able to develop themselves into branches; until, finally, the last vestiges of arboreal growth take refuge under a thick carpet of lichens and mosses, the characteristic vegetation of the Barren Grounds.

E. B. OSBORN.—*Greater Canada*. Chatto and Windus.

By permission of Mr. E. B. Osborn and Messrs. Chatto and Windus.

The Forests of Labrador

The Labrador peninsula may be said to be more or less clothed with forest, with the exception of a small area in the north-western extremity and another along the northern part of the Atlantic coast, which may be called barren grounds. The country northward to 54° lat. is pretty well covered with continuous forest, except on the hill tops in certain districts. Northward of this latitude

its continuity is broken by treeless patches of greater or less extent, and the timber is found principally in the valleys and lowlands.

Within the boundaries of the peninsula, at least twenty-four different kinds of forest trees are to be found, which is about as many as are native to all Europe. Whether we consider their extent or the variety of the trees, it will therefore be seen that the forests of Labrador are not to be depised. A certain number of the species, however, grow only in the southern part, and a few of them are confined to a small area, even there; still there is a considerable diversity in the trees of the greater portion of the peninsula.

No timber is yet exported from Labrador. The larger trees in the southern parts are fit to be sawn into lumber; but the wood of the country in general will be valuable in future only for such purposes as making paper, pulp, railway ties, telegraph poles, small spars, fencing, house-building, timbering mines, firewood, making charcoal, etc.

The trees seldom reach two feet in diameter, and are generally less than one foot. Their size appears to depend more on soil and shelter than on the latitude, for some of the finest forests are said to be found in the northern parts.

DR. R. BELL.—*Scottish Geographical Magazine*, July 1895.

By permission of the Royal Scottish Geographical Society.

The animals of this region have thick furs to protect them against the winter cold, and, by a curious provision of nature, those which have to hunt their prey amid the winter snows generally have white fur, which prevents them from being too conspicuous.

The Animals of the Tundra

The caribou usually winter in the black spruce woods, just within the edge of the forest, living on the lichens that grow on the rocks or that hang from and festoon the

trees. Towards the end of winter they leave the woods and travel across the open country to the shores of the Arctic Ocean, where the females drop their young, after which they again turn southwards towards the forest. Their flesh is excellent eating. Whether they can be tamed and thus brought permanently into the service of man, or whether they must disappear like most of the other denizen of the wilderness, remains to be seen. Even if they should be doomed to disappear it seems quite possible that they might be replaced by tame reindeer from Lapland, who would feed in summer on the vast grassy plains, and in winter would take kindly to a diet of Canadian lichens.

Musk oxen are the only other large herbivorous animals that live in the open plains of the north, and they scorn the shelter of the forest even in winter, their long shaggy coat of hair furnishing sufficient protection against the severest gales. The white wolf and the wolverine are the two most common predatory animals in the interior, while the white bear and white fox are common in places along the coast.

J. B. TYRRELL.—*Scottish Geographical Magazine*, March 1899.

By permission of the Royal Scottish Geographical Society.

The value of these furs early awakened the greed of European traders, and was one of the chief reasons for the French occupation of the regions round Hudson Bay.

The Fur Trade of Canada

It is impossible to over-estimate the influence which the fur trade has exercised on the destiny of Canada. At the outset, it was the sole reason for the early occupation of the country on behalf of France. It was the cause also of the occupation of the northern and western interior by the Hudson Bay Company. Colonisation had no place at first in the French scheme, and was only encouraged, within limits, later on, after the assumption

of the affairs of New France by the Crown. Even then, the prosecution of the fur trade was found to constitute a real impediment to settlement; the life of excitement and adventure it offered demoralised the younger men in the colony, leading them to abandon the work of clearing, and to neglect agriculture. But, throughout the French régime, furs were the most important source of revenue upon which the economic existence of the colony rested. The St. Lawrence with its wonderful series of lakes, and subsidiary rivers and streams, afforded admirable opportunities for prosecuting that trade over an immense extent of country. By its means also exploration was facilitated, and the French obtained at a very early date a much more accurate knowledge of the geography and resources of the interior than would otherwise have been possible, in view of the vast and impenetrable forest that covered the Atlantic division of Canada, and which barred the approach to the fertile prairie regions of the west.

SIR C. TUPPER.—*Scottish Geographical Magazine*, January 1895.

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The hunters are chiefly Indians who lead a wandering life in pursuit of game, which supplies them with food, and with valuable furs. The latter are brought to the trading posts to be exchanged for those necessaries of life which the wilderness cannot supply.

Indian Home-Life

In times of prosperity the Indian teepees are by no means unsightly. They are of caribou skin stretched around and to within about three feet of the top of the poles, which number according to the size of the lodge. The sides of the circle are banked up with snow and pine-brush, and inside the smallest brush makes a clean-looking and pleasantly-smelling floor. The open fire occupies the centre, and above it, stretching from side to side of

the lodge, are poles upon which the meat is placed to thaw, and from which the kettles are suspended. Around this fire the men and women sit, cross-legged, all day, jabbering incessantly in their guttural speech, and at night they roll up their blankets and stretch out with their feet at the very fire's edge.

Domestic economics are a dead letter in the Indian household. There is no place for any particular thing, and nothing is ever left in any particular place. The back part of the lodge, where it is too cold to sit even when the fire blazes highest, appears to be the general store-room. Everything not in immediate use is thrown there in indiscriminate confusion. If the squaw has finished stripping a caribou leg of its meat, she tosses the bone over her shoulder into the unknown behind her : if she has completed the lacing of a snow-shoe, it is served similarly ; the Indian hurls his knife there when he is through with it, and the children do the same with the bones or intestines or bits of meat they may have filched from the feasting, in which they never share.

Children are not much in evidence in the Indian household. They rarely cry, for experience has taught them that such outward expression of grief or alarm or hurt meets with much personal discomfort. If they are in the moss-bag age, which usually ends at two, they are put into a sort of hammock within the lodge, and rocked at a terrifying pace to the accompaniment of a crooning that would strike terror to the heart of any crying babe. If they are old enough to toddle, they are turned out-of-doors to tell their sorrows to the winds.

The woman is the drudge. Her work is never finished. She chops the firewood, dries the fish and meat, snares rabbits, and carries her catch into the post on her back ; scrapes and tans the moose and caribou hides, from the latter of which she afterwards makes *babiche* (North-land string) by cutting it into strips an eighth of an inch wide ; laces the snow-shoes, makes and embroiders with beads the mittens, moccasins, and leggings ; yields the

lion's share of the scanty larder to her husband when he is at home luxuriating in smoke and sleep, and, when he is away, gives her children her tiny allowance of fish, and goes hungry without a murmur.

This is the woman of the post. She of the woods, the full-blooded squaw—and there are few Indians that ever take up a permanent abode in the settlement—does all this and more. In addition to chopping the firewood, she seeks and hauls it; not only dries, but catches the fish; goes after and quarters and brings in the game her master has killed; breaks camp and pitches it again where the husband, who has gone on ahead with no load but his gun and no thought except for the hunt, and whose trail she has followed, indicates by sticking up brush in the snow. When there is plenty she makes her meal on that which her lord leaves, and when there is little she starves, along with her children and the dogs.

CASPAR WHITNEY.—*On Snow-Shoes to the Barren Grounds.*
Osgood, McIlvaine and Co.

A Hudson's Bay Fort

Built generally upon the lower bank of a large river or lake, but sometimes perched upon the loftier outer bank, stands the Hudson's Bay Fort. A square palisade, 10 to 20 feet high, surrounds the buildings; in the prairie region this defence is stout and lofty, but in the wooded country it is frequently dispensed with altogether. Inside the stockade some half-a-dozen houses are grouped together in a square or oblong form. The house of the bourgeois and clerks, the store wherein are kept the blankets, coloured cloths, guns, ammunition, bright handkerchiefs, ribbons, beads, etc., the staple commodities of the Indian trade; another store for furs and peltries, a building from the beams of which hang myriads of skins worth many a gold piece in the marts of far-away London city—martens and minks, and dark otters, fishers and black foxes, to say nothing of bears and beavers, and a

host of less valuable furs. Then come the houses of the men.

Lounging at the gate, or on the shore in front, one sees a half-breed in tassellated cap, or a group of Indians in blanket robes, or dirty white capotes; everybody is smoking; the pointed poles of a wigwam or two rise on either side of the outer palisades, and over all there is the tapering flag-staff. A horse is in the distant river meadow. Around the great silent hills stand bare, or fringed with jagged pine-tops, and some few hundred yards away on either side, a rude cross or wooden railing blown over by the tempest, discoloured by rain or snow-drift, marks the lonely resting-place of the dead.

SIR W. F. BUTLER.—*The Wild North Land.* Sampson Low.

By permission of Messrs. Sampson Low.

We now pass into regions where the conditions of life are less severe. Canada is nearly as large as Europe, and therefore naturally has many varieties of climate.

Climate of Canada¹

In the Dominion of Canada, a country embracing one-half of the continent of North America, we naturally find a very diversified climate. On the Pacific coast, with the ocean on the one side and lofty mountain ranges on the other, it is moist and temperate; while on the east side of the Rocky Mountains, on the high, level plateaus of the North-West Territories, and in Manitoba, is found a climate with large extremes of temperature, but, withal, a bright, dry, bracing, and healthy atmosphere. In the valleys of the St. Lawrence and Ottawa rivers a cold but bright, bracing winter is followed by a long, warm, and delightful summer; while the maritime provinces lying between the same parallels of latitude as France, and with shores laved by the waters of the Atlantic, rejoice in a

¹ This, though extremely useful for senior pupils, may be omitted by juniors, who will find it difficult.

climate the praises of which have been sung by successive generations of their people.

The climate of those portions of the Territories which lie near the mountains is one of peculiar interest, presenting as it does features which are unknown in countries nearer the sea and away from the mountains. Among the marked features are the rapid changes of temperature which frequently occur in short intervals of time; the great variations in different years, both of the mean temperature of the winter season and of the summer rainfall; also the fact that the summer season in the great Mackenzie basin, just under the Arctic circle, is nearly as warm as in Alberta.

The phenomenon of the rapid changes in short intervals is accounted for and explained by the now well-known Chinook or Föhn effect, which is met with to a greater or lesser extent under the lee of mountains on the windward side of which moisture is precipitated.

For long it was not understood why comparatively warm ocean winds should often, blowing across high cold mountain ranges, descend on the other side at a higher temperature than when at sea-level. It is due to the retardation in the rate of the cooling of the air during its ascent, caused by the condensation of moisture, and by the mechanical heating by compression during its descent on the other side of the mountains. It is when the movement of a storm-centre causes a south-west and westerly flow of air across the Rocky Mountains from the Pacific that the chinook blows over the western prairies. Sometimes a change of wind from north and north-east to south-westerly will, in Alberta, mean a rise of temperature of from, perhaps, 30° to 40° in a few hours.

The variableness of seasons, while not entirely, is certainly to a very great extent due to the varying position of the mean track of storm-centres in different years. The average mean track for January, deduced from many years, is across southern British Columbia; but in some winters the centres persistently move farther south than

in others, and pass into the continent over Washington or Oregon states, and then the chinook does not blow east of the mountains in the Canadian territories, but north-east and north winds prevail, accompanied by continual low temperature. In other years the storm-centres just as persistently move across northern British Columbia, and then the chinook is the rule rather than the exception, and the weather under the lee of the mountains keeps mild.

The province of Ontario can boast of as many distinctly different climates as can any country in the world.

That part of the province which lies immediately north and north-east of Lake Superior, and which forms the northern watershed of that great lake, has a long cold winter, and at times extremely low temperatures are recorded; indeed, scarcely a winter passes without 50° below zero being registered at White River, a station on the Canadian Pacific Railway. As a rule, the snow does not disappear from the woods until the beginning of May, after which time, however, the summer advances very rapidly, and four months of superb weather follow. Travelling east and south-east, the climate quickly improves, and in the valleys of the Ottawa and the Upper St. Lawrence we find a moderately cold winter, but a singularly exhilarating, bracing atmosphere, which makes a zero temperature by no means unpleasant. Signs of spring are not wanting; early in April and by the beginning of May foliage is well advanced, and then follows a decidedly warm summer. The whole of this region is, between the middle of May and the middle of September, included between the same isotherms as the greater portion of France, and, after a protracted autumn, winter sets in again in November.

In the peninsula of Ontario, or that portion of the province which lies east of Lake Huron and north of Lake Erie and the western portion of Lake Ontario, the winters are by no means severe, and the summers are seldom oppressively hot, this being due to the tempering influence

of the lakes by which this part of Ontario is surrounded. In the western counties the April mean temperature corresponds nearly to that of southern Scotland, and in May the mean temperature of the whole district is slightly higher than for the south of England. The temperature conditions during the summer months may, as in the Ottawa and Upper St. Lawrence valleys, be compared with those of France, the normal temperature for July ranging between 66° and 72° . September and October are generally delightful months, and seldom does snow remain on the ground until well on in December, except on the high lands of the interior counties. That portion of Ontario which lies immediately east of the Georgian Bay, the district of Muskoka, at an elevation of 700 feet above the sea, abounding in small lakes, possesses a wonderfully bracing atmosphere, which, with a very high percentage of bright sunshine and a pleasant temperature, has made this region a summer resort much frequented by people from the cities and towns farther south.

The importance of the covering of snow during the more severe winter weather cannot be over-estimated, as it protects the roots of trees and herbage, and, besides this, enables those engaged in the lumbering trade in the northern parts of the provinces to get the timber from the bush to the banks of the streams on which the huge logs are floated down to the mills, when in the early spring the rapid melting of the snow and ice causes a flooding of all water-courses.

PROF. R. F. STUART. — *Scottish Geographical Magazine*, February 1898.

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When discovered by Europeans, Canada was covered, from the Atlantic coast westwards to Lake Winnipeg south of the tundra, by dense continuous forests, out of which the settled portions of Eastern Canada have been

carved. Rivers were the only roads, and without his bark canoe the Indian would have fared badly.

The Indian Bark Canoe

In all wooded regions of Canada, our means of transport is the birch-bark canoe of the natives. This craft is still constructed just as it was before the advent of the white man in America. Nothing but the prehistoric materials enter into its construction.

The rind of a mature canoe-birch tree is tough and durable, a roll of it having some resemblance to leather. The inner side is turned out to form the bottom, and the different sheets are sewn together by long split roots of the spruce, which are also used to sew the bark to a narrow frame or gunwale. It is lined inside by long strips of cedar, split as thin as cardboard, placed lengthwise, and held in position by light semicircular ribs of the same wood set closely together, their ends being caught between the inner side of the bark and the gunwale. The seams are made tight by the gum of any coniferous tree, neatly laid on. Paddles or sails are used in smooth water, but in rapids setting-poles or tracking-lines are required. The falls on the rivers, and the intervals between the nearest bays of two neighbouring lakes, are overcome by carrying the light canoes and their cargoes on the backs of the voyageurs along the "portages," or trails, which have existed at such places from time immemorial. A small canoe can be readily carried by one man, and the larger ones by two to four men. Everything being in the form of handy packages, the cargo is quickly transferred from one end of the "portage" to the other. The ordinary portage load for a man is 200 lb., and it is held upon his back by a pack-strap or "sling," the loop of which is placed upon the forehead.

The white man has invented nothing to equal the Indian canoe for the purposes for which it is used. It is

light and durable; it runs well, and is easily repaired; materials like those of which it is built may be procured to repair damages at almost any place where an accident may happen, and the voyageurs understand how to make these repairs expeditiously. It is still used by most surveyors and explorers for all their transportations, and also by the Hudson's Bay Company to take in their goods and bring out their furs.

Except for the black flies, mosquitoes, and midges or sand-flies, there is much that is enjoyable and even fascinating in exploring the northern wilds of Canada by following the canoe routes. In toiling up a rapid river, we may at any turn come face to face with a picturesque fall, never before seen by white man. After portaging across a divide, we may on the same day have the enjoyment of descending a swift-flowing stream, varied by the occasional excitement of running a dangerous rapid; or, in following a winding river, we may be surprised by its suddenly opening into a lake, so long that one cannot see the opposite end.

Much of one's success in carrying out these explorations depends upon having good voyageurs. The Indians, if well selected, are the best, although half-breeds are often very good. The party should be as small as possible, since it is easier to take along provisions and other necessities for a small number than for a larger one. Good voyageurs understand the work so well that few orders require to be given. In the evening, as soon as the head of the party has selected camping-ground, the canoes are quickly unloaded, and turned upside down to dry. Every man has his appointed work to do, and he sets about it at once. In about one hour from the time of landing all the tents are up, the blankets spread, and supper is ready. Our beds are made upon the ground with the tips of the boughs of the balsam fir, or, in its absence, of the spruce. They are laid in regular order like slates on a roof, the lower surfaces uppermost and the stem ends sloping downwards. They form a springy

bed, with a delightful perfume, which would soothe one to sleep if any help were needed.

DR. R. BELL.—*Geographical Journal*, 1897.

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Vast areas of Eastern Canada are still covered with virgin forest. Along the Atlantic coast the forest trees are chiefly evergreen conifers, mixed with deciduous trees farther inland. In the forests round Lake Superior some pines are 100 feet high.

The western slopes of the mountains which border the Pacific are also densely forested and contain many cedars and the great Douglas pine.

The forests of Eastern Canada are frequently ravaged by forest fires.

Forests and Forest Fires

Forest fires are natural phenomena, being mostly due to lightning in the summer-time, and they have no doubt been going on from time immemorial. Lightning is of frequent occurrence during the hot, dry season in all parts of Canada.

Let us imagine ourselves in an old forest of this region, of practically unlimited extent, and consisting of a dense growth of black and white spruce, Banksian pine, tamarack, and balsam fir. The smaller trees fill up the spaces between the larger ones, and all are crowded so closely together that their branches touch or intermingle with each other. In this way a sufficiently dense mass of fuel is formed to support a continuous sheet of flame on a grand scale, and yet it is sufficiently open to furnish a plentiful supply of air to carry on the conflagration. The ground is deeply covered with moss, and an accumulation of fallen trees and branches is lying about in all directions. After the prolonged hot weather and drought of the summer months the moisture has become thoroughly dried out of the gummy boughs of the standing trees.

leaving their great store of resin and turpentine, as well as the wood itself, all ready for burning. The mossy carpet and the fallen timber are alike dry. All the conditions are now ready, and only await a spark of fire to start one of the wildest and grandest scenes of destruction which can take place on the face of the earth.

When the fire has got under way, the pitchy trees burn with almost explosive rapidity. The flames rush through their branches and high above their tops with a terrifying sound. The ascending heat soon develops a strong breeze, if a wind does not happen to be blowing already. Before this gale the fire sweeps on with a roaring noise as fast as a horse can gallop.

The irresistible front of flame devours the forest before it as rapidly as a prairie fire licks up the dry grass. The line of the gigantic conflagration has a height of 100 feet or more above the tree-tops, or 200 feet from the ground. Great sheets of flame disconnect themselves from the fiery avalanche and leap upwards as towering tongues of fire, or dart forward, bridging over wide spaces, such as lakes and rivers, and starting the fire afresh in advance of the main column, as if impatient of the slower progress it is making. These immense shooting flames are probably due to the large quantities of highly inflammable gas evolved by the heat from the pitchy tree-tops just in advance of actual combustion, and they help to account for the incredible speed of most of the larger forest fires.

The wild animals appear to understand the significance of the roaring noise and the clouds of smoke in the sky in advance of these conflagrations. The terrified deer, bears, wolves, foxes, lynxes, and hares flee for their lives, followed by multitudes of the small fur-bearing animals; but as a rule all are soon overtaken and destroyed. Should any of the larger beasts be fortunate enough to reach a lake or river in time, they may escape, along with the beavers, musk-rats, otters, and minks, which seldom stray far from the water. The birds fly up into

the air in confusion, in advance of the wall of fire, and appear to become stifled by the heat and the smoke, and after fluttering about for a few minutes they fall into the flames and perish.

These great fires come to an end in different ways. It may be by a change in the wind, followed by a deluge of rain, or by coming to a wide extent of previously burnt country, or of small deciduous trees, or to a chain of large lakes.

The dead trunks of the larger trees generally stand for many years after the fire. In the summer following one of these conflagrations, the blackened ground becomes partly covered by a growth of herbaceous plants, berry-bushes, and shoots from the roots and butts of deciduous trees which have retained some vitality, besides numerous small seedling trees. The huckleberry bushes, which are very common for the first few years, especially on rocky, siliceous ground, bear abundant crops of fruit. They have sprung from large old roots, which are almost everywhere present in the thick woods, although their tops are quite inconspicuous, and bear few or no berries. In fifteen or twenty years the ground is covered with poplars, birches, willows, etc., to a height of about 30 feet. By this time the dead trunks of the old *brulé* have lost most of their branches, and the smaller ones have fallen down. If we look under this growth, we shall discover many healthy young conifers overshadowed by the more rapidly growing deciduous trees. At the end of about fifty years the conifers are everywhere showing their heads, in the form of sharp apices, their dark green colour contrasting strongly with the lighter shades of the other trees. In the race to get above the deciduous growth, they develop tall trunks with the branches high up. In one hundred years the poplars are dying and falling down, and the canoe birch has attained maturity and soon after shows signs of old age. Meantime the older conifers have overtopped the other trees and given a new character to the general appearance of the forest. The younger conifers of various

ages, which have been springing up from seed every year, take possession of the ground left by the decay of the first occupants, and in about one hundred and fifty years the forest has again become almost entirely coniferous, and is ready to be destroyed once more by fire. Such is the rotation of crops of trees which is perpetually going on in these regions.

DR. R. BELL.—*Scottish Geographical Magazine*, June 1897.

By permission of the Royal Scottish Geographical Society.

“The maple is usually spoken of as the emblem of Canada, just as the shamrock is the emblem of Ireland, or the thistle of Scotland. The reason is that all over Eastern Canada are groves of this beautiful hard-wood tree. The maple has been of great value to Canadians, for not only does it furnish a very fine hard-wood for polished interior work and for firewood, but from its sap the maple syrup and maple sugar of Canada are made. Every spring, during parts of March and April, the sugar-making goes on, and there are few more delightful experiences for a boy than to spend some days at a sugar camp. The trees are tapped as soon as the heat from the sun is strong enough to make the sap run during the day and under each dripping bore is hung a tin bucket to catch the sap. At the camp is a large stone fire-place, called an arch, on which is set a great flat pan. Once or twice a day the men drive through the woods with a puncheon and gather the sap. It is poured into the pan under which a fire is kept going night and day. The sap looks like water, but its taste is sweet, and as it boils the water evaporates, leaving the delicious dark syrup. This is poured into cans and sealed for future use or shipped to the city markets. But the great event at camp is a ‘sugaring off.’ A couple of large black pots are hung over a fire outside, each containing a quantity of maple syrup which is slowly boiled. At a certain stage, a little of it when cooled makes delicious taffy. Over each pot hangs a small bit of fat pork, the drip from which keeps the syrup from boiling over. The pots are carefully watched, for there is quite an art in knowing just when the syrup has been boiled long enough. When this point has been reached, the pots are placed on the ground and their contents thoroughly mixed by means of wooden paddles, then run into moulds and allowed to harden. This is the method of making maple sugar, a most delicious sweet, and in the early days an invaluable addition to the larder of the settlers.”—E. R. PEACOCK.—*Canada*.

Spring is a beautiful season in the forest, and autumn or the fall paints the woods with colours of indescribable beauty.

The Seasons in Nova Scotia

April ushers in some fine days, and the increasing power of the sun tells upon the masses of snow in the fir-woods and the rotting ice in the lakes; and at last comes a fierce storm of wind and rain, with a warm, oppressive atmosphere. The snow, with the exception of a patch or two in hollows, has all disappeared from the face of the earth, and the great monotonous fir-woods themselves lose their dark wintry aspect and blackness, assuming a lively green tint, and emitting, as one wanders through their sunny glades, faint odours of that delicious aroma which pervades the atmosphere in the heat of midsummer. We cling to these balmy spring days all the more closely as we dread the chill easterly wind, and the dark sea-fog which may cover us with its gloom on the morrow; for we live on the shores of the "mournful and misty Atlantic," and many a spring day must be darkened by fog and chilled by gales from the floating ice-fields drifting down the coast, before the tardy green leaves of the hard-wood fully appear.

About the 20th of May the presence of spring is perceptible in the sprouting of little leaves on almost all the smaller deciduous shrubs, simultaneously with the light green sprays of the larch. From this time vegetation progresses with extraordinary rapidity; a delightful change in the atmosphere almost invariably occurs; the cold easterly winds cease; balmy airs from the westward succeed, and assist in developing the tender buds and blossoms, and in a few days the face of the country, lately so bare and dreary, glows with warmth and beauty. All nature rejoices in this pleasant season; the songs of the hermit-thrush, robin, and of a host of warblers, the cheerful piping of the frogs throughout the warm night, and the soft west wind, which borrows an indescribable fragrance from the blossoms of innumerable shrubs and plants now flowering in the woods and on the barrens,

afford charms which more than repay for the gloom of the long and trying winter.

The red blossoming maple now exhibits crimson flower-clusters topping each spray, almost vying in colour with the glories of its autumnal foliage; the Indian pear and wild cherry, growing in great abundance throughout the country, seem overburdened with their masses of delicate white blossoms, and impart a fragrance to the air, in which are mingled a thousand other scents; for in this land nearly every shrub and plant bears sweet-smelling flowers. The blueberry and huckleberry now show their pretty heath-like blossoms, in promise of the abundant harvest of delicious fruit which is so acceptable to birds, bears, and bipeds throughout the fall; the rich carpet of mosses in the fir-woods is adorned with a great variety of flowers, and large tracts of country are tinted by the rich lilac flower-masses of the wild azalea, which blossoms even before its leaves have sprouted from their buds.

This delightful season is, however, of short duration—imperceptibly losing itself in the increasing heat and development of summer. A few days change the aspect of the country marvellously, and the broadly-expanding leaves of the maple produce a dense canopy of shade in the forest. Nothing can be brighter than American spring verdure, nor does it degenerate into the dull heavy green of English summer foliage—the leaves maintaining their vernal hue on the same branch, side by side with the brilliant orange scarlet of their dying fellows, at that beautiful season, the fall of the leaf.

The advent of summer is characterised by the waning of the flower-masses of the rhodora, and the succession of the crimson whorls of the kalmias. The swamp vegetation, headed by the Indian cup and blue flag, flowers abundantly in ponds and in moist hollows in the woods, the dark-red drooping petals of the former prettily-contrasting with the blue of the iris. The fir-forest at this season becomes intensely heated, and emits a strong

aromatic odour. Where a tree has fallen, its withering branches fill the air for some distance around with a most delightfully fragrant scent of strawberries.

Lastly comes the flora of autumn, with its asters and golden-rods; and these, choosing open barrens and fields as their residence, leave the woodlands almost without a flower. In September the full brightness of the fall colour is brought out on deciduous foliage; fast fading, however, towards the close of the month, and altogether disappearing by the end of October, the last lingering phases of autumnal glory being the rich golden-yellow hue assumed by the larch, and the dark Indian-red of the leaves of the oak and whortleberries. Then comes the Indian summer, a season of dreamy delight, when a warm, hazy atmosphere mellows the rich brown foreground and distant blue hills of the woodland picture. The hermit-thrush now warbles forth his farewell from the spruce groves; the robins congregate on the barrens, busily picking the remains of the berry-harvest ere their departure for the south; and the squirrels and wood-marmots hasten into their granaries their winter supply of acorns and beech-mast.

November is not far advanced before cold northerly winds and black frosts remove all traces of the beautiful fall. The bear and the marmot hibernate; the moose select their winter yards; the last detachments of lingering robins depart, and the retreating columns of wild geese are soon followed by the fierce driving storm, which buries the hard frozen ground under the first snows of the long American winter.

CAPTAIN CAMPBELL HARDY.—*Forest Life in Acadia*. Chapman and Hall.

Winter is the busy season in the forest. It is then that the trees are felled and dragged to the banks of the streams, which still form the best roads through the forest.

Lumbering in Canada

Early in the fall bands of young men start for the forest shanties from almost every part of Eastern Canada. They are chiefly farmers' sons and farm labourers. In addition, there are the regular shantymen, who spend most of their lives at the business, but they go into the woods earlier to begin operations. During the spring and summer, part of these regular lumbermen work in the saw-mills, while the rest are the famous river-men who bring down the logs from the shanties to the mills. On their way to the shanties the men go by rail as far as possible, and are then driven on big lumber sleighs for miles into the woods. Many of the young farmers bring horses with them and act as teamsters during the winter. In the preceding summer the forest-rangers and the inspector choose a section of the woods for the season's operations, and here the shanty is built. It is a long, low, log building with a roof sloping from front to rear, a great door at one corner, and bunks for fifty men. The bunks are built along one side and end, in a double row, one above the other, like the berths of a steamship. About the middle of the side opposite the bunks is the "caboose," or cooking fire. Here sand is laid over a large patch of the ground, to the depth of a foot, and this is the shanty oven. The smoke escapes through a hole in the roof. The cook first builds a large fire and keeps it going until the sand is red-hot right through. He then rakes off the coals and buries in the burning sand the flat iron kettles in which he bakes his bread, pork, and beans. He covers them up and draws back the coals. Everything is cooked beautifully in this way; the shanty bread is as white and light as that of the best housewife in England. All meals are much alike, and consist of fresh bread, baked pork and beans, molasses, rice, and tea with plenty of sugar.

When the men reach the shanty they are divided by

the foreman into four gangs, each with a boss and a special class of work to do. The best men fell the trees and cut them into logs. Another lot drag the logs to a central point for the teamsters, who draw them to the lake or river, while the green hands make roads and clear away brush before the men who are dragging in the logs. Everything moves with the utmost regularity, and an astonishingly large amount of work is done. The logs are all drawn to the nearest lake or stream, where they are piled on the ice, or on the bank if the current be too swift for good ice. The supplies are hauled from the supply depôt by men called coasters, each of whom has a team of heavy horses and a large sleigh. They often come 60 or 70 miles through the woods with their loads. Each shanty has a storehouse and a stable for the horses. The men retire very early and are up long before day-break. The teamsters rise before three o'clock and feed their horses; half an hour later all have breakfast, and by four they are all off to work. About noon they have a cold meal, and at dusk return to the shanty with such appetites as only shantymen have. Nothing so sharpens the appetite as the long day among the odorous pine, with the smell of the freshly-cut wood, and the hard work in the cold air. There are no more healthy or hardy men to be found anywhere than the lumbermen of Canada.

Were it not for the hard frost and snow, it would be impossible to carry on lumbering operations. The ground and swamps in the forests freeze hard, and then, when they are covered with snow, the lumbermen can go anywhere and haul their logs with ease. But it is not very cold in the forest, for the trees keep off all the winds, and the men never suffer from cold while working.

As soon as the ice on the smaller streams begins to break up in April, the river-men get to work floating the logs down the flooded streams. It is hard work, and men often spend hours wading in the icy water. But the greatest haste is needful, for the water soon subsides, and



any logs not down must be left till next season. About the time the smaller streams are clear the ice on the lakes begins to go. The logs are held by a boom till all are in the main river, or usually a lake expansion. When they are all down the men let them drift. A boom is a long chain of logs fastened together end to end by means of short bits of rope or chain, and is used for holding and dragging logs. The men follow the drive, sweeping the river as they go—that is, leaving no logs lying on the shore or in the mouths of creeks, but keeping all moving before them as they work their way slowly down stream. The drives, as they are called, often number 150,000 logs, and quite cover the river for a mile or two. The cook's caboose follows the drive on a large raft, and cooking is done as it drifts along. In the evening the raft is moored at a convenient spot, and the men sit on the grass and eat their meals. They sleep in tents, unless the mosquitoes become too troublesome, when they often push into mid-stream and sleep on the raft.

But it is at the numerous rapids that the river driver finds the excitement and danger of his occupation. Here, as the logs go through, they gradually stick and pile up along the sides until the whole river, except a narrow channel, is blocked. The water is dammed back and rushes through the channel. The men guide the logs with their long pike-poles, and try to keep them running, but a log is sure to stick before long, and those coming swiftly behind pile up and make a jam that closes the channel. The men rush down and try to let off the jam before it gets too big. They work hard, hopping about from log to log with the utmost dexterity, and every moment running risks from which only their skill saves them. Presently the key log is found and worked loose by means of cant-hooks and pike-poles. Then there is a rush of foaming water and tossing logs, over which the men must run or be crushed to death. To the onlooker the task seems impossible, but they dash across whirling logs, balancing themselves like acrobats, leaping hither



RAFTS OF SQUARED TIMBER ON THE OTTAWA.

and thither, never missing their step on the heaving, tossing mass. Every man wears boots whose soles are studded with sharp nails to prevent slipping, but, despite this, their skill and coolness are wonderful. To see a man poise himself daintily on a rushing log, moving his feet rapidly to keep on the upper side, then, with a mighty leap, land on an equally unstable footing, and keep his balance while the foam tosses and the water roars about him, is a sight to stir the coldest heart.

As the logs come into the lake they are caught in booms and towed across by a steam-tug, and so they move slowly down stream, taking the whole summer for their journey, and reaching the mill usually about the end of August or first of September. The saw-mills are built on the bank of the river, at some point where there is a good railway or steamship connection.

During the summer a saw-mill presents a scene of the liveliest activity. At night electric lights are called into service, and so night and day the busy hum of the saws is heard. The logs are hauled up from the river by endless chain carriers, placed on moving carriages, and cut into lumber by the lightning band-saw and the gang-saws, which cut up half-a-dozen logs at once. Thence machinery carries the boards to the edges to be trimmed, and outside slabs to the wood-pile to dry for firewood, and the saw-dust and small bits to the great furnace which burns all refuse. As the boards move on their carriers, a man stands by, who swiftly measures and marks them. Outside they are sorted and stacked in piles ready for shipment.

The Ottawa is the most important lumber river in Canada, with the St. John second. To the former flow half-a-dozen large rivers, each bringing down its two or three drives every year. In addition to the rough logs for the mills, a great deal of square timber for England comes down the Ottawa. The timber is fastened together in cribs, and a great number of these cribs are joined to form a raft, which often covers an extent of an acre or

more. The men have a little hut on the raft, and live there. When falls or rapids are reached, the timber must go through a slide just wide enough to receive a crib, so the raft is broken up, sent through one crib at a time, and put together again below. The water rushes through the slide very swiftly, and a trip down on a crib is a most exciting experience. At the bottom it shoots into the river with a plunge which buries half its length in the water for a moment. The rafts go slowly down the Ottawa until they join the St. Lawrence above Montreal, then down the St. Lawrence to Quebec, where the timber is loaded on ships for England.

E. R. PEACOCK.—*Canada.*

By permission of the High Commissioner for Canada.

In the settled parts of Eastern Canada thousands of square miles have been cleared of forest, and in these the farmer has replaced the hunter and the lumberman.

Farming in Canada

The farmers of Eastern Canada devote a great deal of attention to dairy-farming; in fact, many of them have given up almost entirely growing of grain except for fodder. In the west also more attention is paid to dairy-farming each succeeding year, with good results. Cheese and butter factories are built throughout the country, in the east, at very short intervals, and to these almost every farmer sends his milk. A favourite plan is to have two sets of machinery, and to make cheese during the summer and butter during the winter. The cheese industry is one of the most important, and is growing with great rapidity. Nearly all the cheese is shipped to Britain, in whose markets it is a favourite on account of its good quality. The export of butter on a large scale began later, and the volume of trade is not nearly so large as that of cheese, but it is overtaking its rival. On every farm there are flocks of poultry. The eggs are gathered

up regularly by buyers, who drive through the country and call at each house once or twice a fortnight during the summer. A short time before Christmas the turkeys, geese, and other fowl that have been fattening are killed, dressed, and taken to what is called the "turkey fairs."



MAIZE CULTIVATION (CANADA).

Here they are bought by dealers, who ship them to various markets for the Christmas trade. So important is this trade considered that in some particularly suitable localities, such as Prince Edward Island, the Government has established poultry-fattening stations as examples for the farmers in methods of feeding.

E. R. PEACOCK.—*Canada*.

By permission of the High Commissioner for Canada.

Fruit-growing reaches perfection in the south of the province of Ontario.

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The Province of Ontario and the Niagara Peninsula

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a Of the provinces Ontario is by far the greatest and
t wealthiest. Bounded by three great lakes, Ontario, Erie,
i and Huron, and by three great rivers, the St. Lawrence,
f Detroit, and Ottawa, so that its position, though in the
middle of the continent, is almost insular; equipped
with a most complete railway system; having a climate
which favours the growth in abundance of grapes, peaches,
melons, maize, and similar products in the south, and is
singularly suited for wheat, barley, and all the hardier
cereals farther north; with petroleum and salt areas in
the west, timber areas on Lake Huron, mineral deposits of
great variety and extent on Lake Superior, the province
seems almost unique in situation and resources for pro-
duction and commerce of all kinds.

s
f

Speaking generally, agricultural employment and pro-
ducts in Ontario are not unlike those of the United
Kingdom; a warmer summer and drier autumn giving,
in comparison, advantages in ripening fruit and harvest-
ing grain; a colder winter presenting drawbacks in the
feeding of stock and for outdoor farm work.

1 A visit to the Niagara peninsula of Ontario upsets
many preconceived ideas about the Canadian climate. It
is the greatest fruit district of the Dominion. Grapes,
peaches, melons, and tomatoes are raised in the greatest
profusion in the open air. As a consequence, the markets
of all the principal towns of Eastern Canada are in the
season supplied with fruit in extraordinary abundance,
and at a price which makes it part of the ordinary diet of
the poor.

The fruit-growing industry of the Niagara district is
already important, but a steadily widening market seems
likely to give it a great expansion. Few parts of Canada
illustrate more fully the advantage which has come from
the extension of the railway system of the Dominion.

Many hundreds of tons of grapes, pears, tomatoes, etc., are shipped yearly from the country between Hamilton and Niagara to Winnipeg, whence they are distributed as far west as the Rocky Mountains. Eastward a market is found as far as Prince Edward Island and Nova Scotia, the latter of which, though an excellent apple region, does not favour the growth of grapes and peaches. Special fruit-trains are run regularly during the autumn to Toronto and Montreal, and fruit transport forms at this season an important item in the receipts of the Grand Trunk and other lines. The export of apples from Ontario to Britain is very large.

Ontario supplies much the larger proportion of the cheese and live cattle which the Dominion sends to England, and now aims at increasing its output of butter, especially during the winter, in alternation with the cheese-making of the summer.

DR. G. PARKIN.—*The Great Dominion.* Macmillan and Co.

By permission of Messrs. Macmillan and Co.

A traveller gives a graphic account of the hot summers in this region :

“Ninety-five degrees in the shade ! All day Lake Ontario lay like a sheet of blinding blue radiance, against which the little boats stood out in silhouette so sharp as almost to hurt the eye : the sands on the shore sparkled like grains of gold, the path of sunlight that pointed across the dancing ripples was one dazzle of diamonds. All day the sky was without a fleck of cloud, and the sun's fierce rays fell like flame on whatever they touched. We were inveigled, by the promise of a breeze and a peach-orchard, into taking a drive which, whether it was long or short, appeared interminable. Neither white umbrellas, green veils, nor puggarees were of any avail against the piercing sun. As for shade, even in the peach-orchard we could only find little patches of shadow immediately under the trees. The orchard stretched away for acres and acres ; for aught we could tell, it might have been for miles and miles. The great trees bowed down, overburdened with their fragrant load. Each branch bore a wealth of glowing fruit. Peaches, unripe and overripe, bestrewed the ground ; we trod them down in the long, rank grass ; they lay scattered round in barbaric luxuriance. The owner of the orchard broke off large boughs, bending under their weight of golden-rosy and rosy-purple fruit. The peaches as we touched them were burning with the sun-glare, and warm to the luscious core.

“The sun sloped westwards ; the shadows lengthened, and with

evening came a singular change, not in the temperature, but in the atmosphere. A strange, lurid, dun colour overspread the heavens; a terrible stillness seemed to brood over the earth; not a leaf rustled nor a bird chirruped; and the lurid haze, deepening as dusk drew on, shed a coppery-yellow tinge over the whole landscape. The day is still remembered there as the yellow day. We heard the curious effect attributed to distant forest fires."—LADY DUFFUS HARDY.—*Between Two Oceans*. Hurst and Blackett.

In the great plains west of the forest area are hundreds of square miles of wheat-fields, and the area of wheat cultivation increases every year.

Wheat-Growing in the Central Plains

Except in the ranching country, the western farmers devote their energies mainly to wheat-growing. When the threshing and marketing of the crop are over in the fall, ploughing begins and goes on steadily until stopped by the frost in November or December. In April the land is seeded with wheat, after which the ploughing is completed, and the oats and other crops put in. Then the farmer waits for the harvest, busying himself meantime with his dairy cattle, and the cultivating of the potatoes and other roots, or in breaking up fresh prairie land. In July the hay is cut, dried in the sun, and stored in the barns or in stacks. If many cattle are kept, the green Indian corn is cut and stored, to be pressed and used as winter food for the milch cows. As the wheat begins to head out, the western farmer casts many an anxious glance at the weather probabilities, for occasionally a late night-frost comes at this season and damages his crop. In August the wheat is ripe and the harvest begins. The grain is rapidly cut and bound into sheaves by machines called binders. In the east it is stored in barns to be threshed later, but the crop is too large for this in the west, so it is hauled to a stack and piled ready for the threshers. Just before cutting, the western wheat-fields present a lovely picture. As far as

the eye can reach, the grain waves and ripples to the warm summer breeze like a sea of gold.

As soon as the grain has been cut and stacked, comes the threshing—a most important part of the work. In the west people live far apart, so a threshing gang goes with the mill. They sleep in a large conveyance somewhat like a car, which is drawn from place to place by the traction engine, which draws the threshing machine and supplies the driving power when the mill is at work. As the hum of the threshing mill begins the scene is a lively one and worth watching. Every man has his appointed place, and the stack of grain grows rapidly smaller as the pile of straw heaps up and the bags are filled with bright clean grain. As soon as threshing is over, the farmer hauls his grain to the nearest railway station, where it is sold and stored in the elevator ready for shipment to the east over the Canadian Pacific Railway.

E. R. PEACOCK.—*Canada.*

By permission of the High Commissioner for Canada.

Farther west the plains are too dry for agriculture and are devoted to stock-raising, or ranching.

Ranching in the Western Prairies

In Southern Alberta, the chief business is ranching. Each rancher has from one to ten sections of land, or from 640 to 6400 acres, usually well watered and covered with grass, which makes good fodder both summer and winter. This grass is peculiar inasmuch as it does not form a turf like that of other countries, but grows more in tufts. The close cropping of sheep is therefore very injurious, and sheep ranching is forbidden in Southern Alberta; though in some other parts of the territories large flocks of sheep are kept.

The cattle and horses are branded with the stamp of their owner and then allowed to roam at large on the plains. They remain out all winter, and can live easily

on the grass; but a certain amount of wild hay is stacked every summer for use when a thaw is quickly followed by frost, as it is then very difficult for the cattle to get at the grass. Twice each year—in the spring and fall—there is what is called a “round up” of all the cattle in each district. A certain number of cowboys are sent out from each ranch, and they gradually gather in to a central place all the wandering cattle or horses. Then the cowboys go through the herd, cutting out the cattle of their own ranches, with their young. The brand is the means of identification, so that cattle brands are of the utmost importance in the North-West, and the man who fails to respect them must expect severe treatment if found out. The cowboys and their ponies show remarkable skill in selecting and cutting out their own cattle. In this way the herd is gradually separated into various groups, and these are driven to their own ranches, while the cattle that have strayed in from other districts are all sent to one ranch, and the various brands advertised in the newspapers, so that the owners may come and claim their cattle. Thus each rancher gets all his cattle together twice a year. The herd is gone over and the young ones branded. As many as possible are sold and shipped to England, the United States or the mining districts of British Columbia.

Horses are treated as the cattle, but all that are sold must be broken to riding. The western pony or broncho, is a hardy, stubborn fellow, who, when broken in, will endure almost any amount of hard work. When tamed he is a thoroughly obedient and faithful companion, intelligent and easily managed; but he does not give up his freedom without a struggle. The breaking in of the pony is known as “broncho-busting,” and calls for all the cowboy’s skill. It takes from three to six weeks to tame a broncho, and, as there are many to be broken every spring, the cowboys are kept very busy. The horses are quite wild at the beginning, but have become thoroughly obedient before a good rider lets them go.

The cowboys guide their horses, not by the bit, but by the pressure of the rein on the horse's neck. They teach the ponies to respond instantly to this pressure, and also to stand perfectly still when left with the bridle rein trailing over the head. Their own mounts are wonderfully clever little fellows, and at the *round-up*, the way in which they will follow a steer in and out through the surging, bellowing herd, until they have driven it out, is quite remarkable. When the rope is thrown by their riders they stop at once and throw their weight on the haunches, so as to pull up the captured animal with a sudden jerk. They enter thoroughly into the spirit of their master's work, and aid greatly in carrying it out. The cowboys are a jolly, noisy, restless lot of men, picturesque in dress and manners, brave and strong, but full of mischief and rough fun. They are, perhaps, the finest riders and revolver shots in the world, while their handling of the long rope, or lasso, seems to the tenderfoot, as they call any newcomer, simply marvellous.

E. R. PEACOCK.—*Canada.*

By permission of the High Commissioner for Canada.

Glimpses of these different regions are seen in crossing Canada from east to west. Halifax, in Nova Scotia, and St. John in New Brunswick are the chief easterly ports of Canada. The great estuary of the St. Lawrence, on which are built Quebec and Montreal, leads far into the heart of the country and gives access to the Great Lakes—Superior, Michigan, Huron, Erie, and Ontario. Michigan is in the United States, but the others have shores in Canada. Between Lakes Erie and Ontario are the Niagara Falls. The Ottawa River, on which is Ottawa, the Dominion capital, flows down through the forest country into the St. Lawrence below Lake Ontario. The Canadian Pacific Railway (C.P.R.), which has its eastern terminus at Halifax, in Nova Scotia, and its western terminus at Vancouver on the Pacific coast skirts the St. Lawrence, follows the Ottawa River for some distance and



ICEBERGS IN ST. JOHN'S HARBOUR.

then strikes west across the Central Plains, to the base of the Rocky Mountains, which, with other Pacific ranges, have to be crossed before the Pacific is reached. This western part of Canada is called British Columbia. Its capital is Victoria, on Vancouver Island.

Halifax, Nova Scotia

The chief feature of Halifax, the Atlantic terminus of the Canadian Pacific Railway, is its harbour, which undoubtedly is one of the finest in the world. This harbour is accessible at all times, and experts assert that a thousand vessels might safely rest therein.

Halifax itself is located on a rocky peninsula, the harbour being to the south and east of it. The water narrows on reaching the upper end of the city, but again expands into what is called Bedford Basin, which is said to contain 10 square miles of safe anchorage. There is nothing architecturally interesting in the city, yet as the chief naval station of British North America it possesses an interest of its own. The surrounding country is very lovely, especially in the Annapolis valley.

STUART CUMBERLAND. — *The Queen's Highway*. Sampson Low.

By permission of Messrs. Sampson Low.

Up the St. Lawrence to Quebec

By noon we were, with our pilot at the masthead—for the fog lay only a few feet above the water—slowly steaming up the mighty river, losing many of our passengers at Rimouski, where the mail tender meets the steamer and the inter-colonial railroad is available for any one to whom a few hours are of importance.

The wooded southern shore of the St. Lawrence was plainly visible, and the air was laden with the delicious scent of pine forests, while the eye was charmed and rested after the weary waste of waters by the ever-varying green and grey of the distant hills and the

spotlessly white dwellings of the French Canadian settlers along the shore.

The last part of the voyage was as charming as the prelude to it was wretched. We left the fog far behind, and had that rarity in a Canadian summer, a cloud-flecked sky, giving additional beauty to the scene, by the shadows which alternated with the most glorious sunshine over the rippling water, rocky islands, and steep fir-clad banks. The whole of the river, after it becomes narrow enough for its shores to be seen, is exceedingly beautiful, with its constant succession of lovely islands and the most perfect background of hills, looking perfectly blue in the evening light, with here and there a warp of mist flitting across them.

At last we passed on the north bank the splendid falls of Montmorenci, and soon after came into full view of one of the three most grandly-situated cities in the world—Quebec. Edinburgh surely deserves a place among them, but who will agree as to the third? By the time that the big ship had made a circle under the frowning Heights of Abraham, and was lying alongside the wharf at Point Levis, night had come on, and the city was outlined from citadel to water's edge by twinkling stars of electric light, reflected and multiplied by the ripples of the restless river.

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 DEE AND CLUTTERBUCK, P. C. 4287: *A Ramble in British Columbia.* Longmans.

By permission of Messrs. Longmans.

For a picturesque and fuller account see *A Canadian Tour*, chaps. i. and ii. Times Office, 1886.

Quebec

Quebec is always be remarkable for its historical associations, and for the exquisite beauty of its scenery. The traveller, however far he may have rambled, cannot fail to recognise that the view from Durham Terrace is one of the finest he has ever seen. On one side is the



citadel in all its strength and grandeur. On the opposite bank of the river, Point Levis stands forth with its coves and buildings and scenes of stirring life. Immediately below the majestic river itself flows in a great placid stream on its way to the ocean. To the north rise the bold heights of the Laurentian range. The whole scene furnishes a panorama rarely to be met. In Quebec one feels that one is on a spot where every foot of space was once of value, from the necessity of protecting the whole by works of defence. We are taken back to the European life of insecurity of two centuries ago. Quebec is the one memorial of that condition of things on the American continent.

SIR S. FLEMING.—*England and Canada.* Sampson Low.

By permission of Messrs. Sampson Low.

Up the St. Lawrence from Quebec to Montreal

The St. Lawrence flows about 180 miles from Montreal to Quebec, a broad stream through the wide alluvial valley, the mountain cliffs, which guard the river bank at Quebec, and give such boldness to the scenery, receding above the city and thus broadening the plain. The shores become less bold and the adjacent country flattens. On the northern bank is the busy town of Three Rivers. The river St. Maurice comes in here. This river drains a large and important timber-producing region. Its course is marked by rapids and waterfalls. Three Rivers is a great timber-exporting port. The St. Lawrence above this town is broad and monotonous, and ultimately widens out into Lake St. Peter, 9 miles wide, and very shallow, except in the ship channel, which has to be kept dredged out. The shores are low, and little is to be seen but the shipping and an occasional timber raft, covering acres of surface, and floating lazily with the current. Above the lake, after passing clusters of islands, we come to the chief affluent of the St. Lawrence in this part of its course, the Richelieu, which drains Lakes

Champlain and George and all the region southward to the Hudson valley, its navigation being improved by the Richelieu Canal, connecting the St. Lawrence and the Hudson.

Above this frequent villages are passed, that are practically outlying suburbs of Montreal. Among a maze of wooded islands the lower part of the turbid waters of the Ottawa flow in. Parish after parish is passed, each with its church and *presbytère*, with their narrow windows and steep roofs, all covered with strong tin. The villages cluster around the churches, and between them are long stretches of arable land almost unbroken by trees, save where the Lombardy poplar stands up stiffly. The steamer labours against the strong St. Mary current as it comes up to the great city. Montreal lines the western bank of the broad river, its miles of water front superbly faced with long-walled quays of solid masonry and marked by jutting piers, enclosing basins for the protection of shipping. On either hand, at the extremity of the long rank of vessels, up and down the stream, looms up a huge grain elevator. The long line of the great Victoria tubular railway bridge, which brings the Grand Trunk Railway across the St. Lawrence, stands upon its row of limestone piers, and guards the horizon up the river to the south. Behind the broad wharf rise rank after rank of storehouses and stately buildings, and in and beyond these are myriads of domes, spires, and steeples, with the lofty towers of old Notre Dame prominent in front. The grand background to this noble view is made by the mountain that gives Montreal its name.

ANON.—*A Canadian Tour.* Times Office.

By permission of the Proprietors of the *Times*.

Montreal

It is late in the afternoon before the Indian pilot comes on board for the shooting of the great Lachine



MONTREAL FROM MOUNT ROYAL.

W. Notman & Son.

Rapid. Whirlpools and a storm-lashed sea mingle in this reach, for the shoal water is hurled about among the rocks. The greatest care and precision of skill are necessary, for with lightning speed we rush between two rocks, jagged and cruel. This natural barrier to the water connection between Montreal and the West is overcome by canals running parallel with the rapids.

The Victoria Bridge, a triumph of engineering skill, spans the river above Montreal. It is built of solid blocks of granite, a mile and three-quarters in length; and it is in passing under its noble arches that we get our first view of Montreal, the metropolis of the Dominion.

A filmy mist lay over the "City of Spires," spreading up even to the sides of Mount Royal, the wooded mountain that rises abruptly behind the city. The golden dome of the old market of Bonsecours, and the twin spires of the Cathedral of Notre Dame, loomed faintly out from its midst. Before us there is a sea frontage of 3 miles—vessels of 5000 tons being able to anchor beside the quay.

The French evacuated Montreal 150 years ago, but you might think it was but yesterday. The quaint gabled houses and crooked streets of the lower town, the clattering and gesticulating of the white-capped women marketing in Bonsecours, remind one of a typical Normandy town. Notices are posted in French and English, and municipal and local affairs are transacted in both languages.

LADY VINCENT. — *Forty Thousand Miles over Land and Water.*
Sampson Low.

By permission of Messrs. Sampson Low.

From Montreal to Lake Ontario

The St. Lawrence above the city flows 172 miles north eastward from Lake Ontario. Just above Montreal are the Lachine Rapids, short, turbulent, and dangerous

The river there broadens into a series of lakes, above which are the Long Sault Rapids. Above this the St. Lawrence becomes the boundary between the United States and Canada, and has several flourishing towns on its banks.

At the mouth of Lake Ontario is the famous archipelago known as the Lake of the Thousand Isles, a remarkable formation made by fragments of the range of Laurentian mountains which here comes southward to the river. From Kingston, at the foot of Lake Ontario, the river threads its tortuous passage among the islands to Ogdensburg, some 40 miles below. There are said to be actually 1692 islands, of all imaginable shapes, sizes, and appearances, some several miles long, others only a few yards, and others again barely visible. They vary from gaunt masses of rock to gorgeous foliage-covered gardens. Cluster after cluster of little circular islands is passed, covered with trees, the channel marked by little white-washed wooden lighthouses.

ANON.—*A Canadian Tour.* Times Office.

By permission of the Proprietors of the *Times*.

The Ottawa River and Chaudière Falls

The great Ottawa River is the most important branch of the St. Lawrence. It is over 700 miles long, is contained entirely within Canada, and drains with its tributaries a basin covering 80,000 to 100,000 square miles, said to be the most productive pine-timber region in the world. It is a romantic river, filled with falls and rapids, and has an irregular width, being almost lost in some places in the lakes into which it broadens, whilst in other places the width contracts to 40 or 50 yards, and the waters are precipitated over the rocks in wild fashion. For about 25 miles above its mouth the Ottawa is from 1 to 6 miles wide, and is known as the Lake of the Two Mountains. About 6 miles above the city of Ottawa begin the rapids, which terminate in the

Chaudière Falls at that city, where the water plunges down 40 feet, and where part of it is said to disappear through an underground passage, the outlet of which is unknown. The Ottawa River is navigable for 250 miles, the rapids and falls being avoided by canals. The Rideau River enters at Ottawa, and this is used for the construction of the Rideau Canal, connecting the Dominion capital and the Ottawa valley with Kingston, at the foot of Lake Ontario. The Gatineau River also falls in there, a tributary of great volume, over 400 miles long.

The great boiling cauldron of the Chaudière is the chief natural attraction of the city of Ottawa, and it is as beautiful as it is grand. Owing to the peculiar formation of the rocks, all the waters of the broad river are diverted into a sort of basin about 200 feet wide, down which they plunge with great commotion and showers of spray. The endeavour has been made to sound this curious place, but the line has not found bottom at 300 feet depth. The narrowness of the passage below the falls has allowed a suspension bridge to be thrown across at that place to the suburb of Hull, and this bridge, passing in front of the falls, gives opportunity for an admirable view, wherein the handiwork of nature, with its foaming waters, clouds of spray, and gorgeous rainbows, is flanked by timber piles and saw-mills, which send out gushing streams of water and saw-dust into the river below.

ANON.—*A Canadian Tour.* Times Office.

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Niagara Falls

Next morning about six we passed through Buffalo, and with only the glimpse of a distant flash of white foam, which may or may not have been the Falls, steamed into Niagara station, and thence drove across the suspension bridge to the Canadian side, putting up at Clifton

which has a superb view of both the American and Horse-Shoe cataracts. Of these hundreds of descriptions have been written. From them and from photographs of the Falls, and especially from the moving pictures, one may get a rough idea of what they are like. We learn that there are practically two distinct falls, with a full quarter-mile of island between them, and that the American is a few feet higher than the Canadian, or Horse-Shoe. Guide-books tell you that the St. Lawrence is a mile wide at the place where it makes its great leap of 160 odd feet



A BIRD'S-EYE VIEW OF THE NIAGARA RIVER.

(Showing the broad, quiet, upper course, the cataract and the gorge below.)

Ruskin describes the rush of water at the rounded brink of the precipice as "sheer polished velocity," yet no description quite prepared me for what I saw.

The American Fall is very graceful. The water is a pale brownish green only for the first 6 or 8 feet down; it then becomes broken into spray, and remains snow-white for the rest of its descent. From its base long rolling clouds of mist are blown out over the water, and rise, but soon melt into the air, and seldom ascend to the level of the brink. One cannot possibly criticise so calmly the vision which meets the eyes if they turn farther to the west, past the dry, ruddy face of the

precipices beneath the dark trees of Goat Island. There, on the left, nearly a mile away, the sunshine kindles to transcendent whiteness a curved cliff of foam; and from just behind it bursts forth cloud after cloud of spray as though fired from a thousand guns, now rolling up billow on billow, now in countless spear-points of water turning at once to the finest mist—a mist which floats across the gorge, and rises broad and triumphant, decked with snow-white plumes and feather sprays, until, a mass of silver cloud, it drifts away across the summer sky. Just above this cloud of foam the great body of the river's water comes over in one massive unbroken liquid wall of clearest emerald, fretted and flecked with falling crescents of foam, coruscating and scintillating in the sunshine. Here and there, on the arch of the water, flash, for an instant, drawn-out reflections of the sun-like glittering threads of fire; but it is impossible for any one to put into words the look of irresistible power, of overwhelming strength and crushing weight, of that translucent mass of crystal. The thunder of the conflict shakes the land for a long distance round, and for 300 feet or more from the bottom of this fall, the broad surface of the river is one seething and hissing mass of foam, tossed with waves hurrying from side to side.

Strikingly grand as Niagara is under bright sunshine, it is still more impressive at sunset and by moonlight. To take the evening of Tuesday, August 10, for instance, we were then looking at the American Fall from the west. Near the horizon lay a bank of heavy cumulus thunder-clouds glowing in the orange and scarlet of sunset against a sky of pale saffron, piled up one above another, like range upon range of very lofty rounded snow-peaks. Filmy, salmon-coloured stratus, in long level lines, cut the upper slopes of these cloud mountains; whilst below them and nearer lay another range of weird dark purple clouds, contrasting wonderfully with the gorgeous hues of the distant giant range. Sharp against the inky horizon leapt and tumbled the amber breakers of the rapids,

flanked with deep warm green of the foliage on Luna and Goat Islands, the smoother patches of water reflecting the pale blue of the sky nearer the zenith. The tresses of the fall itself were all palest cream, losing themselves in the glowing heart of the half-transparent foam-wreaths slowly curling up from depths already growing dark in the shadow of the cliffs. And who shall describe the wonders of the Horse-Shoe Fall at this solemn hour? Who shall paint the subtle shades of the huge pillar of rosy mist ever rising to the sky, or the magic of the clean-cut sheets of emerald descending close beside this hazy, opal tower?

That night about eleven o'clock, from Table Rock, which juts out over the waters, I saw the Horse-Shoe Fall by the brilliant full moon, which then stood over the rapids above the cataract, so that part of the water above the centre of the great curve was in shadow, whilst to right and left the shadow fell obliquely on the waters in their descent. Palest grey are they, except just where they curve over; there, funneled streaks of molten silver form the highest lights in all the picture. Only the thunder of the falling waters, even louder now than by day, betray that they are real, so visionary and ethereal do they look. Dark and impenetrable, the serrated woods on either shore guard the boundaries of the endless race of eager waters, and over all the stars are glittering, set in the high arch of night.

T. C. PORTER. — *Impressions of America*. Pearson.

By permission of Mr. T. C. Porter and Messrs. C. Arthur Pearson.

From Lake Superior to Banff by the C.P.R.

Our journey to the Far West, through golden wheat, begins at Fort William; from there the Canadian Pacific takes us across to the ocean. From Fort William we passed through a wild rocky country, following the Kaministiquia. Night closes in on this lonely country. In the cold early morning we reach Rat Portage, at the outlet of the beautiful Lake of the Woods. We are still

travelling through the same rock-bound country, ungainly masses of rock protruding through a scrub growth of dwarf trees. This is succeeded by a run through some "muskeg," or black peaty bog land, where flourish rank grasses against a background of bushy poplar trees.

Thirty or forty miles from Winnipeg the country opens out, and gradually assumes a prairie character. The land is quite flat now, covered with coarse yellow grass, and sprinkled with wild flowers. There are great patches of gorgeous wild sunflowers, masses of purple and white Michaelmas daisies, bluebells, lupins, marsh-mallows, cyclamen, and acres of golden-rod. As we pass out of Winnipeg station we see the enormous plant and rolling-stock of the C.P.R., which has here its half-way depôt between Montreal and Vancouver. They have miles of sidings, now full of plant waiting to be pressed forward to bring down the harvest to the coast. We could not have chosen a more favourable moment for visiting the North-West, as the harvest is in full swing. We are passing through a sea of golden grain, acre after acre extending in an unbroken line to the horizon.

For over 400 miles, from Regina to Medicine Hat, a vast steppe extends. There is no green thing on it, but it is covered with coarse grass, burnt to a sere yellow. The prairie is trackless as a desert; lonely as the ocean; vast and colourless as a summer sky. The atmosphere is so clear that the blades of grass stand out alone, and a distant sage-bush is intensely blue. The only variety is found in the great saline lakes we frequently pass.

After leaving Medicine Hat we ascended the valley above the South Saskatchewan, and passed on to a more fertile prairie.

Calgary is the capital of Alberta, and the centre of a great ranche country. It does not lie under the Rockies, but 50 miles away.

We are soon well into the foot-hills, those grassy rounded slopes, which are the first rising ground from off the prairie, and which lead up to and end in the Rocky

Mountains. The great amphitheatre of mountains is beginning to impress us with its barren, purple scars; and just as we are entering them our guard stops the train, and takes us out to see the Kananaskis Falls in the Bow River.

We are now breaking through the outer barrier of the Rockies, and penetrating deeper into the mountains. They rise up on every side as we wander through the green valley by the side of the Bow River, our travelling companion for many days to come. It is curious to notice the difference between the two ranges we are passing through. Those to the left are fantastically broken into varied shapes and forms penetrated by crevasses, full of deep-blue and purple-red shadows. The range on the right is formed of grey and white hoary-headed peaks, and looks brilliantly cold and white in the strong sunlight.

Another hour or two and we reach Banff.

LADY VINCENT.—*Newfoundland to Cochin China.* Sampson Low.

By permission of Messrs. Sampson Low.

From Banff to the Pacific

Resuming our journey, we are soon reminded by the increasing nearness of the fields of snow and ice on the mountain slopes that we are reaching a great elevation, and two hours from Banff our train stops at a little station. We are told that this is the summit of the Rocky Mountains, just a mile above the sea.

Two little streams begin here, almost from a common source. The waters of one find their way down to the Saskatchewan and into Hudson's Bay, and the other joins the flood which the Columbia pours into the Pacific Ocean. Passing three emerald lakes, deep set in the mountains, we follow the west-bound stream down a tortuous rock-ribbed cañon,¹ where the waters are dashed to foam in incessant leaps and whirls. This is the

¹ Pronounced, and often written, canyon.



ROCKY MOUNTAIN.

Wapta, or Kicking-Horse Pass. Ten miles below the summit we round the base of Mount Stephen, rising directly from the railway to a height of more than 8000 feet. From the railway, clinging to the mountain side, we look down upon the river valley, which, suddenly widening, here spreads between the pine-clad mountains a mirror-like sheet of water, reflecting each peak and precipice.

Still following the river, now crossing deep ravines, now piercing projecting rocky spurs, now gliding through level park-like expanses of greensward, with beautiful trees, lakelets, and brooks, with here and there a saw-mill or a slate-quarry, we soon enter a tremendous gorge, whose frowning walls, thousands of feet high, overhang the boiling stream which roars at their base, and this we follow for miles, half shut in from the daylight. Two hours from the summit, and 3000 feet below it, the gorge suddenly expands, and we see before us, high up against the sky, a jagged line of snowy peaks of new forms and colours. A deep, wide, forest-covered valley intervenes, holding a broad and rapid river. This is the Columbia. The mountains before us are the Selkirks, and we have now crossed the Rockies. Sweeping round into the Columbia valley, we have a glorious mountain view. To the north and south, far as eye can reach, we have the Rockies on one hand, and the Selkirks on the other, widely differing in aspect, but each indescribably grand.

Crossing the Columbia, and following it down through a great cañon, we shortly enter the Beaver valley, and commence the ascent of the Selkirks. For 20 miles we climb along the mountain sides, through dense forests of enormous trees, until, near the summit, we find ourselves in the midst of a wonderful group of peaks of fantastic shapes and many colours. At the summit, 4500 feet above tide water, is a broad level area, surrounded by mountain monarchs. To the north is a great glacier, whose clear green fissures we can plainly see. To the south is another vastly larger, by the side of which the

greatest of those of the Alps would be insignificant. Smaller glaciers find lodgment on all the mountain slopes, whence innumerable cascades come leaping down.

Descending westerly from the summit, we reach in a few minutes the Glacier Hotel, at the foot of the grandest of all the peaks in the Selkirks—Sir Donald—an acute pyramid of naked rock, shooting up nearly 8000 feet above us. In the valley far below we see the glacier-fed Illicilliwaet, glistening through the tree-tops, and beyond the mountains rise in immensity and majesty beyond all comparison. To reach the valley the engineers wound the railway in a series of great curves or loops all about the mountain slopes, and as we move on this marvellous scene is presented in every aspect. We plunge again for hours through precipitous gorges, deep and dark, and again cross the Columbia, which has made a great detour round the Selkirks, while we have come directly through them. The river is deeper and wider here, and navigated by steamboats for nearly 200 miles. On its east bank stands Revelstoke, the supply point for the mining districts up and down the river, and here are large works for smelting silver ores, which are brought from the mines by the railway and steamboats.

We are now confronted by the Gold Range, another snow-clad series of mountains, but broken directly across, and offering no obstacle to the railway. The deep and narrow pass through this range takes us for 40 miles or more between parallel lines of almost vertical cliffs, into the face of which the railway is frequently crowded by deep black lakes, and all the way the bottom of the valley is thickly set with trees of many varieties and astonishing size.

A sudden flash of light indicates that we have emerged from the pass, and we see stretching away before us the Shushwap Lakes, whose crystal waters are hemmed and broken in every way by abruptly rising mountains. After playing hide-and-seek with these lovely lakes for an hour or two, the valley of the South Thompson River

is reached, a wide, almost treeless valley, already occupied from end to end by farms and cattle ranches. Then comes Kamloops, the principal town in the interior of British Columbia, and just beyond we follow for an hour the shore of Kamloops Lake, shooting through tunnel after tunnel. Then the valley shuts in, and the scarred and rugged mountains frown upon us again, and for hours we wind along their sides, looking down upon a tumbling river. We cross the deep black gorge of the Fraser River on a massive bridge of steel, seemingly constructed in mid-air, and enter the famous cañon of the Fraser.

The view here changes from the grand to the terrible. Through this gorge, so deep and narrow in many places that the rays of the sun hardly enter it, the black, ferocious waters of the great river force their way. We are in the heart of the Cascade range, and above the walls of the cañon we occasionally see the mountain peaks gleaming against the sky. Hundreds of feet above the river is the railway, notched into the face of the cliffs, now and then crossing a great chasm by a tall viaduct, or disappearing in a tunnel through a projecting spur of rock. For hours we are deafened by the roar of the waters below. The scene is fascinating in its terror, and we finally leave it gladly, yet regretfully.

At Gale the cañon ends and the river widens out, but we have mountains yet in plenty. We see Chinamen washing gold on the sandbars, and Indians herding cattle in the meadows. Salmon drying on poles near the river gives brilliant touches of colour to the landscape.

A gleaming white cone rises to the south-east. It is Mount Baker, 60 miles away and 14,000 feet above us. We cross large rivers flowing into the Fraser. The valley widens out. Farms and orchards become more and more frequent. Touching the Fraser River now and then, we see an occasional steamboat, and here in the lower part the water is dotted with Indian canoes, all engaged in catching salmon.

At Mission a branch line turns off to the south, crossing

the Fraser River immediately, and connecting at the international boundary with railways extending along Puget Sound to Seattle, Tacoma, Portland, and San Francisco, and all the way to the Gulf of California, passing those glorious isolated peaks that stud the Pacific coast, Baker, Tacoma, Hood, and Shasta.

Passing through a forest of mammoth trees, some of them nearly 300 feet high, we find ourselves on the tide-waters of the Pacific at the eastern extremity of Barrard Inlet. Following the shore of this mountain-girt inlet for half an hour, our train rolls into the station at Vancouver, the western terminus of the C.P.R.

The Canadian Pacific Official Guide.

"In this journey from plains to sea, the entire system of the Rocky Mountains is crossed, and the observing traveller will notice that there are in all four pretty well-defined ranges. Of these the Coast range and the Gold range are nearest the sea, and are characterised by mountains of low or moderate elevation, generally covered by coniferous forests nearly or quite to their summits. The streams and large rivers have cut deep channels through the rocky strata, and have made gloomy cañons in the process. It was in these two ranges of British Columbia that the greatest engineering difficulties were encountered when the railroad was building.

"The third range from the coast is the Selkirk range, justly celebrated among the mountaineers as the 'Switzerland of America.' In this range the highest peaks attain an altitude of about 11,000 feet. The rocks have been carved out into domes and pyramids of striking forms and appearance. The valleys are clothed in a dark green covering, a dense coniferous forest of cedar, hemlock, spruce, and pine. The humidity of the climate, caused by the damp air-currents from the Pacific passing over the lofty mountains, is the reason why these forests are so dense. The undergrowth of ferns, alder bushes, and the prickly Devil's Club, combined with the moss-covered tree trunks here and there lying prostrate in the forest, offer an almost impassable jungle to the explorer travelling with pack-horses. The very great precipitation in winter accumulates in snow-fields of considerable area on the higher parts of the mountains, and from these glaciers descend into the valleys to an altitude of 5000 feet above the sea-level. The contrast in colour and form between the dark green forests of the valleys, the pure snow and blue ice of the glaciers, and the brown or iron-grey cliffs of the higher peaks, gives an ensemble of mountain beauty and grandeur comparable to that of the Alps or Caucasus.

"The fourth and last range is nearly 400 miles from the Pacific coast. Its mountains rise in sheer cliffs and escarpments direct from

the plains, and tower up in sullen walls of rock from 3000 to 5000 feet above their bases. This range of the Rocky Mountains proper is frequently called the Summit range. The highest crest forms the divide or watershed between the rivers that flow into the Atlantic, and those that drain into the Pacific, and is also the boundary between the Canadian provinces of British Columbia and Alberta. These mountains are in many respects quite different from the Selkirks and other ranges to the west. The mountains are higher and more rugged, reaching altitudes of nearly 12,000 feet; the snow-fields and glaciers are even more extensive than those of the Selkirks, while the forests are far less dense and the trees smaller in size. Wherever the mountains are made of horizontal strata, the weathering has produced curious natural monuments and sharp pinnacles of strange and fantastic forms, while very often an entire mountain resembles some ancient castle with towers and battlements imitating in appearance the works of man with striking fidelity."—W. F. WILCOX.—*Journal of School Geography*, 1897.

Victoria and Esquimalt

Towards nightfall we had the south end of Vancouver on our right. Here it is lower than to the north. Groups of trees and denser forest, interspersed with open glades and stretches of what looked like pasture, and houses, stood about. Then we saw the electric lights on shore, passed by a lighthouse on a point of land, entered a bay, and had arrived at the fair Island City.

Our first excursion was to Beacon Hill, which is in the public park, a suburb of Victoria. Looking down due south one sees the sea, and across it, some 20 miles away, a glorious range of mountains. The water is the Strait of San Juan de Fuca; the mountains are the Olympus range in Washington Territory, United States.

The ice-crowned Mount Olympus, highest of the range—his crest being more than 40 or 50 miles away—shines out in sunlight; then a shadow veils his splendour, but other peaks come flashing into view. The valleys are filled with soft blue mist, which as the sun sets turns to purple, and the snowy peaks shine out in gold and fire. Turning now to the westward we see the entrance to Victoria Harbour, and beyond, 4 miles from us, the entrance to Esquimalt Harbour.

That morning we sat an hour entranced, then turning northwards we looked on land, to where, across more ridges and valleys, across the icy crown of Mount Baker.

The walks and drives round Victoria are all picturesque. Bracken grows everywhere; every roadside was a mass of it. Wild roses were a wonder; the flowers varied from white to deep crimson. They were all about the place, even beside the fences in the city, often growing so vigorously that they might fairly be called trees.

Esquimalt is $3\frac{1}{2}$ miles from Victoria. The road thither is an exceedingly pretty one.

The town or village of Esquimalt is hardly worth mentioning; the Navy Yard is all that one goes there to see, and well worth a visit it is.

You come to a high point on the rocks, from which you get an admirable view. You now find that the Navy Yard occupies the tongue of land which separates Esquimalt Harbour from the Strait of Fuca, and which, in fact, makes it a harbour.

Facing north we had spread out like a mirror the full extent of Esquimalt Harbour, a perfectly land-locked natural basin, about 3 miles long by 2 broad, where were lying the ironclad *Triumph*, the flag-ship, and H.M.S.S. *Condor* and *Caroline*, besides several merchant ships.

This basin of blue and tranquil waters is surrounded by rocky hills and trees and flowers. An arsenal is there, a naval hospital, and a grand dry dock; there are wharves and landing-stages, guns and piles of shot, red-coated sentinels and blue-jackets; and thus, with a mixture of green grass and roses, graceful trees, guns, soldiers, flags, and banners, we saw a very lively scene. Sailors coming there from a lengthened cruise must surely think that they have found an earthly paradise, for it looked more like that to us to-day than a naval station fully armed for war.

T. ROPER. — *By Track and Trail*. W. H. Allen.

By permission of Mr. W. H. Allen.

British Columbia and its Resources

Though so mountainous, British Columbia has thousands of square miles of the finest agricultural and ranching land. In a country so varied, all kinds of land may be found, from the rich river bottom such as that in the Fraser delta, through all the stages to the bare rock with a little sand and moss on the mountain heights. In the valleys of the sections where the rainfall is plentiful the land is rich and heavy, in other parts it requires irrigation from the mountain streams to make it productive. On the higher plateaus, cattle and horses flourish on the rich bunch grass, and ranching is a profitable occupation. All the grains and vegetables of a temperate climate are grown, and in addition fruit-growing is becoming important and promises to assume large proportions.

Immense areas of the province are heavily wooded ; as a result lumbering is a most important industry though as yet only in its infancy. The finest growth is on the coast, and in the Gold and Selkirk ranges. The two most important trees for lumber are the Douglas fir and the cedar, but there are also several kinds of pine, in addition to spruce and other trees. The Douglas fir grows to a height of two or three hundred feet and is the most important tree for lumbering purposes, being especially suitable for use in framing, bridge- and ship-building, and for masts and spars. The cedar grows to a great size, and the amount of cedar cut almost equals that of the Douglas fir. Vancouver is the centre of the lumber trade, but New Westminster and Victoria have also extensive saw-mills.

Mining is the most important industry of British Columbia, and it seems capable of indefinite extension. Gold, silver, lead, copper and coal are all worked extensively, and yet there are immense areas of mineral land still to be explored. The gold mines have always aroused most interest, and were the means of first opening up the Province to settlers. The early mining was all

placer or surface mining. This declined for many years, but is rapidly growing again, and now the introduction of hydraulic mining has added a new feature and made much more extensive operations possible. By means of a powerful stream of water the earth and gravel are loosened, so that they may be easily shovelled into the washing machines, which remove the earth and leave the gold. Quartz mining has made great strides recently, and large towns have sprung up as if by magic where a year or two ago there was nothing but the lonely rocks. The quartz in which the gold is embedded, after being taken out of the mines, is crushed by means of expensive stamp mills, and then reduced in order to get the gold.

The British Columbia salmon fisheries are most interesting, because there is nothing quite like them anywhere else. We all use canned salmon which is generally put up in little round tins with brightly-coloured labels. If you look at the label, you will see in addition to the picture "Skeena River Salmon" or "Fraser River Salmon," and that means that the fish came from British Columbia. It is easier to get salmon in that province than anywhere else in the world. In the season when the fish are running up stream, the flow of water is actually impeded at shallow places by their numbers. Standing on the banks one sees the whole river red with the gleam of their sides, from which the scales have been rubbed in the struggle. Fishing with a hook and line is useless in such waters. Any number of fish can be scooped out at will with a landing net, or even the bare hands may be used with success. In the lonelier parts of the country a bear has often been seen to go down into the shallow rapids, seize a large fish in his claws, drag it ashore and eat it on the bank. The canning factories are built by the streams, and the beautiful fish that are flung in at one side by the thousand very soon come out in cans at the other.

E. R. PEACOCK.—*Canada.*

By permission of the High Commissioner for Canada.

It is interesting to compare this, the most westerly part of British North America, with the island colony of Newfoundland, the most eastern.

Newfoundland

Newfoundland has been well named the Norway of the New World. The deep fjords which indent the shores, everywhere guarded by lofty cliffs, whose forms are reflected in the clear, bright waters of the bays, have a marked resemblance to those of Norway, and are frequently not less magnificent in their scenery. Many of these great watery ravines, running inland for 80 or 90 miles, and exhibiting a wonderful variety of scenery along the great arms which they project in all directions, are on a grander scale than the famous Norwegian fjords. The great bays of Trinity and Placentia, which almost cut the island in two, have no parallel in size among the Norwegian fjords. Then in their short but beautiful summers, their bright skies, their exhilarating atmosphere, their population of fishermen—so abundant in insular peculiarities and primitive characteristics, hidden away in nooks remote from all the outer world, quaint in manners, gracious to strangers—the two countries resemble each other very strikingly.

No element of nature's beauty or sublimity is wanting. In drives or rambles along the shores of bays, the road now scales the lofty hills, then dips down into silent dells, and ever and anon breaks out to the sea through wood-skirted ravines. There, in the distance, are the glittering icebergs sailing majestically past; or here, aground in some quiet cove, lies one of the white wanderers, the waves gently laving its sides, while cascades are pouring from its summit as it melts under the fierce rays of the summer sun. Everywhere the eye is greeted with some new fantastic form of cliff or rich colouring of porphyry rock, while the softness of delicate mosses contrasts with the ruggedness of bare rocks. At almost every turn of

the road little gem-like lakes come into view, their waters clear as crystal, many of them with moss-clad islets sleeping in their bosoms. Such a drive in a bright summer day round those great sea-arms is something to be remembered to the close of life.

The sea-harvest, for which no ploughing or sowing is needed, is that to which the people of Newfoundland at present mainly look for their sustenance. By far the most important of its fisheries is that of the cod. The products of this fishery constitute nearly three-fourths of the whole fishery exports of the colony. It is the largest cod fishery in the world. The cod are taken on the shores of the island, on the Great Banks, a day's sail from the shore, and along the coasts of Labrador. It is wonderful to think that almost from the days of Cabot the cod fishery has been prosecuted, and notwithstanding the enormous drafts every year, there are no signs of exhaustion. There are to-day more fishermen than ever plying their avocations in these teeming waters. Cold-water seas are essential to the life of the commercial food-fishes. The Arctic current, which washes the coasts of Labrador, Newfoundland, Canada, and part of the United States, chilling the atmosphere and bearing on its bosom huge ice-argosies, is the source of the vast fish wealth which has been drawn on for ages, and which promises to continue for ages to come.

It is not, however, owing to its temperature alone that the Labrador current is favourable to the development of the commercial fishes, though that is essential to their growth. The cold current brings with it the food on which these fishes thrive. So far from being unfavourable to the production of life, the Arctic seas and the great rivers they send forth are swarming with life, constituting, in the words of Professor Hind, "in many places a living mass, a vast ocean of living slime." This living slime of the ocean is most abundant in the coldest water, and especially in the neighbourhood of ice. The ice-laden current from Baffin's Bay brings with it these forms of

marine life, from the diatom to the minute crustacean, from the minute crustacean to the crab or prawn, together with the molluscous animals and starfish, in vast profusion. The slime-food sustains the minute crustaceans, and these in their turn furnish food for the herring which swarm on the shores, in the bays, and especially on the Grand Banks. The herring, with multitudes of smaller forms, are devoured by the cod. The mackerel, the hake, the haddock, the salmon, all find abundant supplies. In this way the great fishing interests, on which millions depend for their daily bread, are as dependent on the Arctic current as the farming interests on the rain and sunshine which ripen the crops.

M. HARVEY.—*Newfoundland in 1897*. Sampson Low.

By permission of Messrs. Sampson Low.

The northern part of Newfoundland is in almost the same latitude as the Falkland Islands, off the east coast of South America. Unlike Newfoundland they are treeless, and the only occupation of importance is sheep-farming. The seas teem with fish, but the frequent storms and rough weather prevent fisheries from becoming important as in Newfoundland.

NEW ZEALAND

The colonies most resembling Canada are New Zealand and the temperate parts of Australia and South Africa. All these lie nearer the equator than any part of Canada except the Lake Peninsula, and there is consequently nothing in either to correspond with the vast Barren Grounds or Barren Lands of Northern Canada.

New Zealand, in the latitude of the Lake Peninsula of Canada, consists of long narrow islands, the conditions in which of course differ greatly from those in a vast continental region like Canada. Many similarities, however, may be noted: the western fiord coast, resembling

that of British Columbia; the fine Alpine mountain scenery; the dense forests of the western or windward slopes; the treeless grassy plains in the lee of the mountains of the South Island, with stock-keeping as the principal occupation; the cultivation of fruit in favoured localities; the abundance of yet undeveloped mineral wealth, including gold. Add to this that a parallel for the geysers, hot springs, sinter terraces, etc., of the Hot Lake district can be found a little south of the Canadian frontier in the Yellowstone Park (see *Descriptive Geography of North America*, p. 171), and it will be seen that the parallel between the two regions is more complete than might appear at first sight.

New Zealand

New Zealand has been richly endowed with the stores that go to build up the wealth of nations. The mountain slopes are clad with forests of valuable timber, while beneath the surface there are rich mines and coal deposits that have as yet been scarcely touched. Most of the useful metals occur in greater or less abundance, and gold is found both in the North and South Islands. The climate of New Zealand, which varies between sub-tropical and temperate, has been so often praised that further reference to it is unnecessary, and the whole possibilities held out in the way of colonisation and agriculture are almost unlimited. The natural flora of the islands is luxuriant; but it is a remarkable fact that one can roam through the silent tangled forests of tree-fern, creeper, and pine without any chance of treading on a snake or a scorpion, or of meeting any four-footed animal more formidable than a rabbit or a wild hog of European pedigree.

Iceland has its active volcanoes, snowfields, and geysers; but all are more or less inaccessible, owing to the climatic conditions in that desolate island. In the Yellowstone Park there are splendid geysers, hot springs, and the ruins

of old volcanoes, but none which has been active within historic times. In New Zealand, however, are abundant examples of volcanic phenomena, in all stages of development, as well as snowfields, glaciers, and evidences of the working of earthquakes and other striking earth agencies, thermal springs, geysers, mud-volcanoes, and fumaroles. These lead us up to the vents of Tarawera, and the huge steaming craters of Tongariro and Ruapehu, that rise majestically towards the clouds amidst their covering of perpetual snow. We find, in New Zealand, a combination of the wonders of the Yellowstone and Iceland, in a country that has many additional points of interest, not too far apart, and fairly accessible from the sea on all sides.

H. M. CADELL.—*A Visit to Mount Tarawera. Scottish Geographical Magazine*, May 1897.

By permission of H. M. Cadell, Esq., and of the Royal Scottish Geographical Society.

"The colony is, emphatically, a land of the mountain and the flood, and not only in this, but in the contour of some of its hills, some of its peaks and coast line, it shows more than a fanciful resemblance to the west of Scotland. But the New Zealand mountains are, of course, far loftier than anything in these islands. In our islands you must expect hill and valley, sometimes mountain and ravine, pinnacle and gorge. The seas round us are not shallow, sleepy, or landlocked, but deep, wide, wind-stirred, flecked with foam, and with their blue surface more often than not lit by brilliant sunshine."—HON. W. P. REEVES.—*The Fortunate Islands*. Official.

"Thanks to its great length, the north differs much from the south. While Southland is as cool as Northern France, I have stood, in gardens to the north of Auckland, under olive trees laden with berries, with orange trees, figs and lemon trees in full bearing close at hand. Not far off a winding tidal creek was fringed with mangroves. Exotic palm trees and the cane brake grow there easily. All over the North Island, except at high altitudes, and in the more sheltered portions of the South Islands, camellias and azaleas bloom in the open air. The contrast between east and west is even more sharply defined. As a rule the two coasts are divided by a broad belt of mountainous country. The rain-bringing winds blow chiefly from the north-west and south-west. It is the heavy and often warm rainfall of the west coast that is responsible for the rich luxuriance of the forest growth that nearly everywhere clothes its hillsides, valley, and the shores of its wonderful gulfs."—*Ibid*.

In the Hot Lake Districts of the North Island

The hot lakes district is of very considerable extent. Not a hundredth part of it or its marvels can be seen in one view. How many hot springs are there? asks one questioner. They have never been counted: they are too many. How hot are they? asks another. They are of every degree, from, say, 60° to 212° Fahr. The chief, or, at any rate, the most noticeable, chemical elements producing effects of colour in the thermal district are sulphur, alum, and silica. To the last named we owe the frosty snow-white hue of innumerable terraces, banks, and ledges. The alum walls, or so-called caves, are more greyish. It is to the almost rainbow tints of the sulphur pools, springs, and deposits that the springs owe their most brilliant effects. How can I describe them? It is easy to talk about red and yellow and green, but that does not give you any notion of the infinite and beautiful gradations. Yellow, yes; everything from orange to pale primrose. Red—that means rose, carmine, cardinal, blood-colour, crimson, port-wine. In the same way you may see all the greens, from the deepest emerald to the palest sea-tints. Then how can I give you even the faintest sketch of the inexhaustible variety in which the subterranean forces of fire and water manifest their strength? I can tell you that there are geysers, solfataras, fumaroles and mud-volcanoes by the score; but does that make them boil and roar, and writhe, and seethe, and hiss, and snort, and spout, and teem, and gurgle, and splutter before your eyes? In close contrast with them are often the brightest, tenderest fern and leafage. It may be truly said that the wide plateau in which the lakes stand is not always beautiful, that the ferny terraces and pumice plains are sometimes dreary when away from the water. But then there is so much water; and who can grumble at the scenery of the lakes when once you have reached their shores? Rotorua is but one of many.

Charming as Rotorua is, lying a bright circle, a silver setting round green Mokoia, perhaps its sister lakes are more charming still. Who that has glided in a canoe across the green, placid surface of Rotoiti and has watched the vapour from some steam jet on its beach rising white against a green background of forest will forget that tranquil water? Then, when you have duly inspected the foaming geysers, miniature terraces, and boiling pools of Whakarewarewa, and the dark hell-broth, thick and slab, that bubbles and gurgles in the horrid cauldrons of Tikitere, it will be time to pursue your journey to Lake Taupo. Taupo—"the sea," as the Maoris called the great lake—is one of the finest sights in New Zealand. The air of its uplands is peculiarly tonic and bracing. Away past its south-west corner frown the great volcanoes Ruapehu and Ngauruhoe, the steaming cone of Tongariro. The river Waikato flows into Taupo and flows out again, draining the big lake. Before the inflow it is a pretty, tree-fringed stream merely. After exit it is a fine river, and, nigh the lake, being suddenly jammed into a narrow rocky pass, it boils through the imprisoning chasm and hurls itself in one clear leap, all foam, light, and colour, into the broad, quietly-flowing expanse below. I have said nothing of the Waiotapu Valley, with its long succession of pools, mud-volcanoes, and fumaroles scientifically as interesting as anything in New Zealand, or of the crater, the cinders, the chasms of dark and mischievous Tarawera.

W. P. REEVES. — *The Fortunate Islands.* Official.

The mountain scenery of the North Island is exceedingly fine. The main system is a continuation of the Southern Alps of the South Island. West of this chain rise three imposing volcanic cones, Ruapehu (9000 feet), and Tongariro, with three craters, the highest being Ngauruhoe (7500 feet). The third, "Mount Egmont, stands an almost perfect cone, its flanks curving upward from the seashore for 8300 feet. Utterly alone is Egmont, without peer or rival near, its slopes mantled with dark forest."

Mr Froude, who visited the world-famous pink and white terraces shortly before their destruction by the explosion of Tarawera in 1886,

writes: "Stretched before us we saw the White Terrace in all its strangeness; a crystal staircase, glittering and stainless, as it were of ice spreading out like an open fan from a point above us on the hillside, and projecting at the bottom into a lake, where it was perhaps two hundred yards wide. The summit was concealed behind the volumes of steam rising out of the boiling fountain, from which the siliceous stream proceeded. . . . The Pink Terrace was formed on the same lines as the other, save that it was narrower and was flushed with pale-rose colour. The crystals were even more beautiful, falling like clusters of rosy icicles, or hanging in festoons, like creepers trailing from a rail. At the foot of each cascade the water lay in pools of ultramarine."—FROUDE.—*Oceana*. Longmans.

Among the valuable forest products of the North Island is kauri gum, obtained both from living trees and from the buried remains of long-vanished forests.

The Kauri Districts of the North Island

North New Zealand boasts of a great variety of splendid timber of which the kauri pine takes the lead. These giants of the forest attain a girth sometimes of between 40 and 50 feet, and grow up perfectly straight for 60 or 70 feet before throwing out branches. It is a magnificent timber, and if properly seasoned neither shrinks nor warps.

The country north of Auckland where kauri abounds is very broken, and seldom admits of a tramway being laid down to carry the logs on. When the timber is on high ground the usual method adopted is to cut the logs into suitable lengths, move them by means of timber jacks and immense teams of bullocks to the brow of a convenient incline, and let them slide down a well greased shoot of young kauri trees, a great number of which are thus annually destroyed. If the bush happens to be on the borders of the Kaipara, the logs are placed behind booms, until enough are collected to make a raft. If, however, it is situated some little distance from deep water, the logs are laid in the bed of an adjacent creek higher up, in which a dam is formed and the water stored. When sufficient logs are collected and sufficient water

stored behind the dam, the sluices are opened and the logs washed down to the Kaipara, where they are gathered, chained together, and towed to their destination.

There is another great industry which owes its existence to the kauri. Kauri gum is used in the manufacture of varnish and lacquers. When an old kauri tree dies and falls, its huge roots throw up a mound of earth, and the shape of these mounds indicates the direction in which the trees have fallen, although all signs of the trees themselves have entirely decayed away, perhaps thousands of years ago. As the gum generally exudes freely from the kauri and collects in the forks where the tree commences to throw out branches, by stepping 60 or 70 feet from the mound in the right direction and digging there, gum will probably be found. The mounds themselves also offer good chances, and are generally first attacked. A gum-digger's outfit is not an expensive one. It consists of a spade, a gum spear, and piece of sacking made into a bag. The gum spear is a four-sided rod of steel, about 4 feet long, and pointed at one end. With it the gum-digger probes the ground in different directions, until he strikes a piece of gum. He then digs it up, puts it in the bag, and recommences spearing. When a field has been dug over two or three times, as most of them have been now, and the big lumps have nearly all been removed, the method adopted is to dig in the most likely places. After the gum has been dug up it has to be scraped, and this is generally done by the gum-digger before he offers it for sale. When it is scraped it is easy to see the quality. The rarest kind is quite transparent, and resembles lumps of glass; the next in order is cloudy in places, yellowish looking, and very like amber, although much more brittle. Some again is all cloudy, and the common sort is all opaque.

P. W. BARLOW.—*Kaipara*. Sampson Low.

By permission of Messrs. Sampson Low.

The capital of New Zealand is Wellington, but the largest town is Auckland. Both are on the North Island. Canterbury and Dunedin are the chief towns on the South Island.

Auckland

Auckland is built up on groups of clay and scoria hills, intersected by valleys all trending to the sea, and is backed up by volcanic peaks, one of which, Mount Eden, is now utilised as a reservoir. Farther up the harbour, on the Auckland side, the charming residences and gardens of Ponsonby extend along the cliffs. A singular-looking island, called the Watchman, stands in mid-channel, while to the right, on high ground, stand the North Shore suburbs. The abundant sunshine, illuminating an atmosphere absolutely free from smoke and fog, reflected from the sparkling blue waters of the harbour, and from the gaily-painted houses, the number of pleasure-boats darting here and there, and the absence of all appearance of squalor and poverty, all combine to make one love Auckland at first sight.

J. MURRAY MOORE.—*New Zealand for the Emigrant, Invalid, and Tourist.* Sampson Low.

By permission of Messrs. Sampson Low.

The New Zealand Alps of the South Island contains peaks and glaciers rivalling those of the Canadian Rockies.

The New Zealand Alps

The feature which lends beauty to the Southern Island is the system of mountains, covered with perpetual snow, that stretches unbroken from the Southern Lakes in Otago almost to the Otira Gorge. This pass is situated on the high road between Hokitika and Christchurch, and is the principal way used when crossing from the east to the west coast. The highest point of this system is Mount Cook or Aorangi (12,350 ft.) The comparatively



AUCKLAND HARBOUR.

slight elevation above the sea at which its actual base is situated gives this mountain a grandeur unknown to many snow-capped peaks of greater altitude. The New Zealand Alps, with their broken glaciers, rocky precipices, and virgin summits, present to the climber a tempting field.

Between the higher and lower ranges of the New Zealand Alps two groups of lakes have been formed, the one in Otago, and the other in the Mackenzie country, part of the province of Canterbury. The principal lakes in Otago are Wanaka and Hawea to the north, and Wakatipu farther south. On these several towns are situated. Taking these lakes as a basis for operations, several mountain peaks are within easy distance. We may mention Earnslaw (9165 ft.); Mount Aspiring (9910 ft.); Castor and Pollux (8633 ft.); with many others of an almost equal altitude. Still farther south are Lakes Te Anau and Manipori. Of them all Lake Wakatipu is the longest, covering on its sinuous course a length of more than 50 miles. Te Anau presents a wider expanse, besides which its western shore is intersected by large arms running up between the mountains, after the manner of the fjords common to the coast of Norway. This group of lakes is approached from Dunedin by those who wish to commence their tour from the north, and from Invercargill by those to whom the southern route is more convenient. The Canterbury lakes lie more or less near to the base of Mount Cook, Mount Darwin, and other peaks around. Amidst these ranges are to be found the celebrated Tasman and Godley glaciers.

J. BRADSHAW.—*New Zealand as it is.* Sampson Low.

By permission of Messrs. Sampson Low.

“Though Aorangi has been ascended to the topmost pinnacle, the peaks are many which are yet unsealed, and the valleys many which are virtually untrodden. Exploring parties still go out and find new lakes, new passes, and new waterfalls. It is but a few years since the Sutherland Falls, 2000 feet high, were first revealed to civilised man. Both our glaciers and lakes are on a grand scale. The Tasman Glacier is eighteen miles long, more than two miles

across at the widest point: the Murchison Glacier is more than ten miles long; the Godley eight. The Hochstetter Fall is a curtain of broken, uneven, fantastic ice coming down 4000 feet on to the Tasman Glacier."—W. P. REEVES.—*The Fortunate Islands*. Official.

The Canterbury Plains correspond to the Western Canadian prairies on a small scale, sheep taking the place of cattle. Immense cargoes of frozen mutton are shipped to this country.

Across the Plains of the South Island

Lyttelton stands at the head of a noble natural harbour. It is scattered over the steep slope of the coast range of hills, which culminates in an elevation of 2000 feet. The slimy shallow, at the head of the fine mountainous inlet, has been dredged to a sufficient depth, even at low water, for the large steamers which now come to the port, as well as for the other shipping engaged in the great trade of the Canterbury district in Christchurch. Several large steamers and some smaller craft lay round us. But the bustle of the high shipping time was not yet come round, when all the cereals, the wool, the frozen sheep and bullocks of this rich agricultural and pastoral country, come tumbling in by millions in value.

A railway pierces the coast range by a tunnel to Christchurch, 7 miles off. Quitting the coast range, we entered a vast level plain. There are perhaps as much as 4000 to 5000 square miles of this plain, extending far north and still farther south of the Christchurch latitude, with a soil mostly of the richest character and covered with farms, and sheep and cattle pasturages. In the far distance beyond, 50 to 70 miles westwards, rose one of the interior mountain ranges, 4000 to 5000 feet in elevation, and still covered more than half down from the summit with snow. Beyond this range, and above 100 miles farther west, is the higher range which culminates in Aorangi.

Fifty miles from Christchurch we began to enter upon

a vast area of the plain, utterly featureless in its monotony. At times the only relief our eye could catch was some slight dividing line separating the estates or pasturages. We were thankful for the variety of the bright golden flower of the universally prevalent gorse. This plant has taken root everywhere throughout New Zealand, and is apt to be viewed as a nuisance by the colonists. It made, however, most excellent hedges, and the effect of these, marking out the fields, was remarkably pleasing. Another old friend was the blue gum-tree. Just before reaching Timaru, 100 miles from Christchurch, the flat plain began to change into gentle undulations, which, covered with rich grass, indicated also an improvement in the soil. The snowy range had closed in upon us with less than half the distance which separated us at our starting. At and beyond Timaru we had a beautiful landscape of undulating ground, the hills covered with grass for pasturage, the valleys and levels cultivated. We did not see any of Oamaru's great scale of farming, which already threatens to rival that of the Canadian North-West, where the steam plough, upon a 5- or 10-mile square wheatfield, passes clean out of sight, except through a good telescope. The interior, but at too great a distance from Oamaru and the line of rail, affords the best illustrations of this progress. We passed, however, some large fields, finely ploughed and harrowed. These Oamaru vicinities were succeeded by more monotonous plains, followed yet again by beautiful hill and dale scenery. We were overtaken by the night for the last hour of our journey, during which we missed some of the finest scenes. But, by moonlight, we still saw something, and could realise somewhat the grand view of the Otago Harbour, as we passed along, high up upon the precipitous side of its northern coastline.

Dunedin has a fair backbone of trading to support her. She revels in wool; she has gold, too, as well as the golden fleece, and she has golden corn and other cereals, potatoes, butter, and cheese, and the finest beef



HAVELOCK, NEW ZEALAND.

and mutton, in all but limitless quantity. Slaughtering and freezing of sheep and bullocks for exportation are upon a great scale. In all of these substantial elements of commerce she is in the heat of a close race with her northern sister of Christchurch, which with her vast background of rich, productive plains has latterly been creeping rather ahead.

W. WESTGARTH.—*Half a Century of Australasian Progress.*
Sampson Low.

By permission of Messrs. Sampson Low.

The New Zealand Frozen-Meat Trade

To ensure the quicker despatch of the large steamers which carry the mutton to England, the carcasses are prepared in freezing establishments conveniently situated for the reception of sheep arriving by rail from the country, and as near as may be to the several ports which are engaged in the trade. In these establishments the greatest cleanliness is not only universal but necessary. As each carcass is removed from the slaughter-house, the floor on which it was prepared is swilled with clean water, that it may be perfectly sweet for the next occupant. From the slaughter-house the carcasses are carried by men, their backs covered with clean-sacking, to a well-ventilated apartment resembling a huge larder, there to remain, hanging in long rows, until they have lost all traces of animal heat. When thoroughly cool they are removed to the refrigerating chamber, in which, having been previously wrapped in canvas bags, they are subjected to a temperature of about 30° , for experience has shown that if submitted to too low a temperature at first their inner and fatty parts are not properly frozen. After the frost has once thoroughly permeated a carcass, the temperature of the chamber can be lowered to many degrees below zero, until finally the mutton becomes so hard that a heavy stone, hurled against it with the utmost strength of which a man is capable, can make no impression upon

its surface. From the refrigerating chamber the carcasses are either removed to a storeroom at the works, or carried directly to the vessel which is to take them to London. On board ship they are stowed one on the top of another, in meat-rooms, which are kept at as low a temperature as the engineer in charge may deem necessary, by a separate engine provided for the purpose.

J. BRADSHAW.—*New Zealand of To-Day*. Sampson Low.

By permission of Messrs. Sampson Low.

“To one who suddenly enters a freezing chamber from the outer air, the intense cold does not at once make itself apparent, and it is only after a while that its influence begins to be felt. But, as a matter of fact, the cold is so real and severe that the workmen who remove the frozen carcasses are compelled to wear thick gloves in order to protect their hands from frost-bites.”—*Ibid*.

For the mode of refrigerating by means of compressed air see *ibid.*, pp. 115, 116.

AUSTRALIA

Victoria, the southern part of Australia, and Tasmania, are in the latitude of New Zealand, with similar occupations. The rest of the continent lies in the track of the dry trade winds, which bring little rain, and that only to the coastal regions. The interior is dry, showing a type of country found in Canada only on a very small scale in parts of Alberta, where there are small semi-desert districts. The American parallel for this part of Australia is in the south-western United States.

The forests of Australia are confined to the wetter coastal belts. In the north many tropical species appear.

Vegetation of Australia

There are three great vegetation zones—the *tropical*, the *temperate*, and *Alpine*.

In the tropical coastal region the wealth of the tropical forest is everywhere apparent in the stately and thickly-foliaged timber trees; the impenetrable scrubs of dense

vines and other plants; and the profusion of lovely orchids. The gums predominate, but there are numerous other species, which include valuable cedar-trees, a variety of figs, and many timbers of great commercial value. This tropical flora includes, in the northern and eastern continental regions, screw-pines, mangroves, bamboos, orchids, and several varieties of palms. The dense vine and other varieties of tropical scrubs are perhaps the least valuable of all the forms of vegetation. They cover extensive areas of country, and form a tangled mass of the densest possible description. No plant is more unwelcome to the bushman than the dreaded "lawyer" vine, armed as it is with sharp, powerful spines that strike downwards and are curved inwards. This vine grows in a dense tangled mass, from which it is most difficult to extricate the unwary traveller.

The flora of the interior sub-region of the tropical zone is not remarkable for vigour of growth, the forests being comparatively open, the interspersed grass areas fairly numerous and moderately extensive, and the timber trees have a slightly dwarfed appearance. The absence of a copious rainfall is fully apparent in the general condition of the vegetation of this inland belt. The luxuriant undergrowth, which might naturally be expected in a climate essentially tropical, is mostly absent, and the surface soils have a dry, unfertile appearance. Generally speaking, this class of country is suitable for grazing purposes, and it extends with some notable variations over the entire central basin, into the temperate zone, and across the continent to a portion of the west coast-line; again south to the head of the Great Australian Bight, embracing the whole of the vast inland territory, except the desert region. On the great western plains of New South Wales and Queensland, the continuity of the forest is broken, and the timber trees are replaced by extensive areas of grass and other short herbage, interspersed with small belts or clusters of stunted forest growths and patches of scrub. These last-named forms differ in char-

acter from the coastal scrubs in that they are not so dense and formidable, consisting as they do mostly of dwarfed



G. W. Wilson & Co.

TREE FERNS.

varieties of acacias, existing under climatic conditions not always highly favourable to remarkable luxuriance. The

densest form is locally known as brigalow scrub, which grows almost as close together as the vine species, and when an opening is cut through it the appearance of a high-walled avenue is suggested. The explorers' mulga scrub, of ill-repute, is a sharp, spiny, hardy plant, found growing in the form of irregular bushes that spread out laterally and occur over very extensive tracts of the interior. Still more persistent in growth and wide distribution is the dreaded spinifex (*Triodia irritans*)—an irritating and animal-torturing grass, with rigid, sharp-pointed leaves that inflict painful wounds on the feet and legs of horses and other beasts of burden used in the field of exploration.

The salt-bush plains consist of widely distributed areas of low-lying country clothed with a saline vegetation, rather stunted, fairly nutritious, and useful as a fodder plant when grass is scarce. The vast rolling downs and meadow-like plains of Eastern Australia support a rich herbage, consisting of an almost endless variety of grasses, upon which the immense flocks and herds of the squatting industry feed and thrive. During periods of protracted drought grasses appear to have been completely annihilated, but after the first shower it seems as if some magical transformation had taken place.

The eastern and southern sub-region of this temperate zone is thickly timbered with most luxuriant sub-tropical forests, in which many varieties of the genus eucalyptus are highly developed. First of all, there are the monarchs of the forest, the giant "white gums" of the Dandenong Range (*Eucalyptus amygdalina*). Many of the white gums are over 420 feet in height, and one mighty fallen monarch across a narrow ravine measured 480 feet in length. This latter had about 20 feet of the top broken off, so that in all probability the full height of the tree had been about 500 feet in round figures. The noble *Eucalyptus diversicolor* of the western side of the continent is little inferior in dimensions, numerous examples reaching fully 400 feet in height. Of the numerous species of the eucalyptus none are of greater value medicinally than

the *Eucalyptus globulus*, from which the eucalyptus oil of commerce is derived.

The timbers of the jarrah, the karri (*Eucalyptus diversicolor*), the red gum, the stringy bark, and many other species, are of great commercial value. The timber produced by the jarrah tree (*Eucalyptus marginata*) is now in demand for street-paving purposes, as a hard wood of great durability. It occurs in Western Australia, where there are extensive forests of it.

The *Eucalyptus dumosa* is known as the mallee scrub. It covers a very large tract of country in the western districts of Victoria, and some 9000 square miles, in the lower basin of the Murray River, in South Australia. Viewed from an eminence the dark-brown foliage of this dense mass of vegetation resembles a great sea, extending to the horizon.

The Alpine flora of the continent is restricted to the lofty mountains of Victoria and New South Wales.

Besides the types to which I have alluded, the vegetation of Australia includes many others very striking in appearance. The peculiar bottle-tree, so appropriately named, is one of the greatest novelties. Its trunk is greatly bulged out, and from the middle it tapers to a narrow neck, from which the branches radiate. This tree is a lover of the inland tableland regions, and once seen can never be mistaken.

Altogether there are probably about 10,000 species of flowering plants and ferns in Australia, many of which are very beautiful in colour and luxuriance of growth. Most of the orchids are exquisitely lovely, strange in form, and very highly valued. But of all the lovely flowers that bloom, the giant "rock-lily" is perhaps the most interesting, producing an enormous flower-stalk of considerable height. The beautiful acacias are represented by about 300 species.

J. P. THOMSON. — *Scottish Geographical Magazine*, February 1903.

By permission of the Royal Scottish Geographical Society.

Tasmania resembles the northern part of the South Island of New Zealand.

Tasmania

Tasmania lies to the south of Australia in the southern ocean. It has an area of 24,600 square miles, and some fifty islets belong to it. Most of these lie between it and the southern shore of Victoria in Bass's Strait. It is a land of mountain and flood, with picturesque scenery. The centre is a mass of hills generally covered with forest, with large lakes nearly 4000 feet above the sea ; and this high land is continued to the west and north-west, while southward are other elevations. Ben Lomond in the east rises to a height of 5020 feet.

This small colony has a far greater range of climate than can be experienced throughout the Australian continent. The eastern side is dry ; the western is very wet. Tin and gold miners are partially arrested in summer from want of water in the north-east. Dense forests and impracticable scrubs result in the west from the deposition of a 100 or more inches of rain in the year, while other parts to the east occasionally suffer from drought. Tasmania does not escape the summer visit of an Australian hot wind. Hobart and Launceston, being near the sea, have greater equality of temperature, with rare frosts. Inland, in the settled parts, cold is severe in winter, but only for a short period. The wooded north-west shore has no cold and no excessive heat, but plenty of showers. Up in the lake country the climate rather resembles the Highlands of Scotland. On the west and southern coasts the winds are usually strong, and often tempestuous. As a retreat for Australians in summer Tasmania has strong claims. Cool and strengthening airs, magnificent forest solitudes, and secluded fern-tree vales may be enjoyed along with all the comforts of modern civilisation.



SHEEP FARM IN NEW SOUTH WALES.

"The island has not a large area fit for cultivation. A great part is very mountainous, and dense scrubs, with heavy forests, are impediments to the farmer. The west side is too wet, stormy, and sterile for settlement. Almost all the farms lie on the line between Hobart and Launceston and between Launceston and Circular Head. The climate being cooler and moister than in most parts of Australia, the productions are of an English character."

The great resource of Victoria is sheep-breeding, and wool is a staple product. Compare the early stages of settling in a pastoral country with a similar state of things in Canada, described on p. 36.

Victoria as a Pastoral Colony

Victoria was the first of the Australian colonies to demonstrate that merino wool of exceptional fineness, length of staple, softness, and lustre could be grown in large quantities on the wide pasture-lands of Australia. Though great strides have been made by the flock-masters of other colonies, Victoria still holds her front rank. The beauty of Australian wool is mainly owing to the climate and pastures of the country. In summer the heat is very great, but such is the character of the atmosphere that Europeans can work under the blazing sun, and in the greatest heat, without injury to their health. In winter the cold is never excessive, snow is seldom seen save on the highest mountains. Frosts are frequent, but not so severe as to injure the stock, and the sharpest frost is dissipated before the sun is a couple of hours high. The climate much resembles that in which the merino flocks were reared in their old home in the Spanish peninsula, when they passed the summer in the mountains of Montanar, the winter on the plains of Estremadura. Victoria has justly been called the Land of the Golden Fleece, for her golden fleeces have brought more wealth than any other industry. This colony is an illustration of the truth of the Spanish proverb—"Sheep have golden feet, and wherever the print of their footstep is seen the land is turned to gold."

With a wide extent of the finest pasture-land, and a climate so genial that it was named by the first settlers Australia Felix, Victoria soon outstripped her neighbours in the production of wool of the highest quality. It was noticed by the first colonists that the sheep bred in Victoria grew wool of quite a different character to that produced by Tasmania or New South Wales flocks. The staple was longer, the wool was softer, and had a brighter lustre. The wool became a favourite with European manufacturers, and ever since has maintained its place as the most valuable merino wool in the world.

When Victoria first became a field for colonisation, the early settlers wandered over the country till they found good pasture and plenty of wood and water. They then settled down and took up as large an area of land as they thought they would require. The greater portion of the colony was open forest or almost treeless plains. There were scarcely any difficulties in the way of settlement save some tribes of aborigines, who occasionally killed a few sheep, and the much more troublesome dingo, as the indigenous wild dog was called. The sheep were everywhere shepherded by day, and enclosed in hurdle yards at night. The country was unenclosed, and one might ride from Melbourne to the boundary of the colony in every direction and not meet a fence, save round a rare cultivation paddock. While the land was held as squatting runs, as the leaseholds from the Crown were called, the practice of shepherding the sheep usually in flocks of from 1500 to 2000 in open country, and less in forest land, was universally adopted, but gradually the advantage of running sheep in paddocks became generally understood, and in places where timber was plentiful ring fences and large paddocks were formed. The leaseholds were transformed into freeholds, better fences were put up, and gradually wire fencing came into general use. As smaller enclosures were formed, wells were sunk, dams made, and banks excavated, in order to provide a sufficient supply of water for the sheep; while, later on, belts of timber

were, in the open country, planted across the line of the prevailing winds. These plantations afford a welcome shelter to the stock in wet, stormy weather. Fencing in and subdividing the land and providing an ample supply of water for the stock have increased the grazing capabilities of the country greatly, in some instances the increase being fully fourfold; while the sheep, under the new management, are healthier and yield heavier fleeces.

G. A. BROWN.—*Illustrated Handbook of Victoria, for the Colonial and Indian Exhibition of 1886.* Published by the Victorian Government.

“The great bulk of the sheep in Victoria never receive any food save the natural pastures of the country, and in seasons of drought great sufferings are entailed on the flocks, and occasionally the deaths are very numerous.”—*Ibid.*

Gold-mining is also important.

The Gold-Mining Towns of Victoria

From Melbourne it is easy to journey to the two great goldfields of Victoria, Ballarat and Sandhurst. Sandhurst is the Bendigo of old days. It has had many ups and downs; it has been deserted and has been ruined; but the result is the fine city of to-day, with its broad, tree-lined streets, its splendid buildings, and high degree of commercial activity. There is no mistake about the character of the town. Miles and miles of country before you enter it have been excavated and upturned by the alluvial digger. There are few more desolate sights to be met with than a worked out and deserted diggings. Ugly gravel heaps, staring mounds of “pipe-clay,” deposits of sludge, a surface filled with holes, broken windlasses, all combine to make a hideous picture. Alluvial digging of the shallow type is a curse to the unhappy country operated upon. But alluvial mining has long had its day in and about Sandhurst, and the town lives now by deep quartz mining. You come upon the poppet-heads and the batteries everywhere, even in the beautiful reserve which is the centre of the city.

Ballarat lies 70 miles to the north-east of Melbourne. An upland plateau, with a fringe of hills all round, some now denuded of their timber, and glittering white, cold, and bare in the sun; the earth pitted with holes and gullies, scarified as if by some gigantic rooster, "mullock-heaps," "poppet-heads," and engine stacks everywhere. This is one's first impression of Ballarat. Goldfields are very much like one another all over the world. "Substitute pines for eucalypti," says Mr. Julian Thomas, "and I could imagine this to be California. But when one first drives from the station and sees the magnificent width of Sturt Street, with the avenues of trees planted along the centre, the public buildings, banks, and churches, you are possessed with astonishment that this is a mining town. Ballarat is indeed a great inland capital. The difference between this and Sandhurst is that at the latter place the mines obtrude themselves everywhere. One cannot go half a block but one has mullock-heaps and poppet-heads in view. In Ballarat it is all different. The mines are in the suburbs, and do not deface the town, as at Sandhurst. Embowered in trees, the homes of the people are surrounded with gardens. There is verdure and vegetation in every street."

HOWARD WILLOUGHBY.—*Australian Pictures*. Religious Tract Society.

By permission of the Religious Tract Society.

This volume is highly to be recommended for its numerous and excellent illustrations.

The capital of Victoria is Melbourne.

Melbourne

Its population puts Melbourne into the rank of the first score of the cities of the Empire. If area were considered as the test, the city would not easily be surpassed except by London itself, for a 10 miles' radius from the Post Office is required to cover it all. The city

itself is a compact mass of about $1\frac{1}{2}$ miles square, encircled by large parks and gardens, all the property of the people, and permanently reserved for their use. Built upon a cluster of small rolling hills, the views of Melbourne are pleasantly interrupted, and yet it is possible to obtain frequent glimpses from commanding points either of the whole or of parts of the whole. You will turn a corner and come upon a panoramic peep of streets, of sea, and of spires that takes one's breath away.

H. WILLOUGHBY.—*Australian Pictures*. Religious Tract Society.

By permission of the Religious Tract Society.

New South Wales is a transition between **Victoria** and **Queensland**, much of which is tropical.

Resources of New South Wales

The immense inland districts, stretching from the various mountain ranges to the western and north-western limit, are those in which the great pastoral runs are for the most part found, those being specially favoured which are watered by the River Darling and its tributaries. These plains, covered with saltbush, are the feeding grounds of millions of sheep and other live stock, and during the shearing season enormous quantities of wool are sent to Sydney and other ports for shipment to Europe and elsewhere.

For agricultural purposes the soil of New South Wales cannot be surpassed. The district forming the northern portion of the colony is watered by the Tweed, Richmond, and Clarence, and is generally suitable for the cultivation of maize, sugar, the vine, silk, cotton, arrowroot, coffee, tea, and semi-tropical fruits of nearly every kind. Maize and sugar are very largely grown. Proceeding southward, we have the districts watered by the Bellingen, Macleay, Hastings, and Manning, an area adapted for maize and sugar. Farther south is the Hunter River. On the lower portion corn and lucerne hay are grown in large

quantities, while on the upper the vine and most cereals thrive. In the County of Cumberland, on the alluvial flats of the Hawkesbury and Nepean Rivers, the principal crops are hay and corn. Once wheat was the chief crop, but grazing has become more profitable. From the Illawarra district, great in dairy produce, as far as the southern boundary, a length of about 200 miles, the coast abounds in fertile land adapted for dairy farms. Turning to the mountainous country, the Great Dividing Range, is found the high lands of Manaro, Braidwood, Bungendore, Yass, and Goulburn, with a climate resembling that of England. Over this wide surface wheat and all English cereals, fruits, and vegetables thrive. On the tablelands of New England and Tenterfield, about 3000 feet above the sea, the English climate, shorn of its severity, is again met with. The western slopes of this Great Dividing Range, for a breadth of from 100 to 150 miles, are suitable for wheat and the vine. A very large part of the territory is splendidly adapted for the vine and the silk industry, the mulberry tree thriving everywhere throughout the colony, some parts of which favour the growth of the olive, cinchona, indigo, and rice.

Official.

The capital is Sydney, on one of the finest bays in the world.

Sydney and Sydney Harbour

Sydney proper—the old Sydney of the first settlements—stands on a long neck of land at the mouth of the Parramatta River, between two deep creeks which form its harbour—that is, its inner harbour, where its docks and wharves are. Port Jackson, the harbour proper, from which these are mere inlets, is the largest and grandest in the world. A passage about a mile wide has been cut by the ocean between the wall of sandstone cliffs which stretch along the south-west Australian shores. The two



J. Macfarlane
1897

SYDNEY HARBOUR.

headlands stand out as gigantic piers, and the tide from without and the fresh-water flood from within have formed an inlet shaped like a starfish, with a great central basin, and long arms and estuaries which pierce the land in all directions, and wind like veins between lofty sandstone banks. The rock is grey or red. Worn by the rains and tides, it projects in overhanging shelves, or breaks off into the water and lies there in fallen masses. The valleys thus formed, widened and broadened with age, are clothed universally with the primeval forest of eucalyptus and dark Australian pine—the eucalyptus in its most protean forms, and staining its foliage in the most varied colours, the red cliffs standing out between the branches, or split and rent where the roots have driven a way into their crevices. In some of the landlocked reaches, except for the sunshine and the pure blue of the water, I could have fancied myself among the yews and arbutuses of Killarney. The harbour is, on an average, I believe, about 9 fathoms deep. The few shoals are marked, and vessels of the largest size lie in any part of it in perfect security. Sydney itself is about 7 miles from the open sea. The entire circuit, I was told, if you follow the shore round all the winding inlets from bluff to bluff, is 200 miles.

J. A. FROUDE.—*Oceana*. Longmans.

By permission of Messrs. Longmans.

“The first view of Sydney from the sea-front shows a city built largely in red and yellow sandstone upon rolling coastal ridges, with little level ground anywhere. Some of the older buildings almost overhang the sea, as one often notices in some of the Mediterranean towns. The city itself is something of a jumble, the streets being narrow and irregular, unlike those of Melbourne, which the pioneer surveyors, who came from Sydney and profited by its mistakes, planned broad, stately, and in chessboard fashion at the start. Sydney is said to have been laid out on the lines of the cattle tracks made by the first imported cows, who wandered about the infant settlement.”—W. J. GALLOWAY.—*Advanced Australia*. Methuen.

Behind Sydney lie the Blue Mountains, part of the Eastern Coastal or Great Dividing Range. The Blue Mountains were long considered impassable, owing to the

extraordinary labyrinth of chasms, cliffs, gorges, and ravines in which every route appeared to end. Some of the typical obstacles are described below.

In the Blue Mountains

In the middle of the day we baited our horses at a little inn, called the Weatherboard. The country here is elevated 2800 feet above the sea. About one and a half miles from this place there is a view exceedingly well worth visiting. Following a little valley and its tiny rill of water an immense gulf unexpectedly opens through the trees that border the pathway, at the depth of perhaps 1500 feet. Walking on a few yards one stands on the brink of a vast precipice, and below one sees a grand bay or gulf, for I know not what other name to give it, thickly covered with forest. The point of view is situated as if at the head of a bay, the line of cliff diverging on each side, and showing headland behind headland, as on a bold sea-coast. These cliffs are composed of horizontal strata of whitish sandstone, and are so absolutely vertical, that in many places a person standing on the edge and throwing down a stone, can see it strike the trees in the abyss below. So unbroken is the line of cliffs, that in order to reach the foot of the waterfall, formed by this little stream, it is said to be necessary to go 16 miles round. About 5 miles distant in front, another line of cliffs extends, which there appears completely to encircle the valley; and hence the name of bay is justified, as applied to this great amphitheatral depression. If we imagine a winding harbour, with its deep water surrounded by bold cliff-like shores, to be laid dry, and a forest to spring up on its sandy bottom, we should then have the appearance and structure here exhibited. This kind of view was to me quite novel and extremely magnificent. In the evening we reached the Blackheath. The sandstone plateau has attained the height of 3400 feet; and is covered as before with the

same scrubby woods. From the road there were occasional glimpses into a profound valley, of the same character as the one described ; but from the steepness and depth of its sides, the bottom was scarcely ever to be seen.

Very early next morning I walked about 3 miles to see Govett's Leap ; a view of a similar character with that near the Weatherboard, but perhaps even more stupendous. So early in the day the gulf was filled with a thin blue haze, which, although destroying the general effect of the view, added to the apparent depth at which the forest was stretched out beneath our feet. These valleys, which so long presented an insuperable barrier to the attempts of the most enterprising of the colonists to reach the interior, are most remarkable. Great arm-like bays, expanding at their upper ends, often branch from the main valleys, and penetrate the sandstone platform ; on the other hand, the platform often sends promontories into the valleys, and even leaves in them great insulated masses. To descend into some of them it is necessary to go round 20 miles. But the most remarkable feature in their structure is that, although several miles wide at their heads, they generally contract towards their mouth to such a degree as to become impassable. The Surveyor-General, Sir T. Mitchell, endeavoured in vain, first walking and then by crawling between the great fallen fragments of sandstone, to ascend through the gorge by which the Grose joins the Nepean ; yet the valley of the Grose in its upper part, as I saw, forms a magnificent level basin some miles in width, and is on all sides surrounded by cliffs, the summits of which are believed to be nowhere less than 3000 feet above the level of the sea. When cattle are driven into the valley of the Wolgan they cannot escape, for this valley is in every other part surrounded by perpendicular cliffs ; and 8 miles lower down it contracts from an average width of half-a-mile to a mere chasm, impassable to man or beast.

CHARLES DARWIN.—*Voyage of the "Beagle."* Ward and Lock.

“On reaching Cullenbullen the chain throws off a remarkable basaltic spur to the eastward, the curious sub-ramifications of which render all that sandstone locality commonly called Blue Mountains difficult to approach and yet more difficult to explore. Mount Adine, Mount Clarence, Mount King George, and Mount Tomah crown the northern branch of that spur. Mount Hay and King's Tableland surmount the southern. Between these ranges lie yawning chasms, deep winding gorges, and frightful precipices. Narrow, gloomy, and profound, these stupendous rents in the bosom of the earth are enclosed between gigantic walls of a sandstone rock, sometimes receding from, sometimes frightfully overhanging, the dark bed of the ravine, and its black, silent eddies, or its foaming torrents of water. Everywhere the descent into the deep recess is full of danger, and the issue almost unpracticable.—P. E. DE STEZELECKI. —*Physical Description of New South Wales*. Longmans.

The western flanks of the Great Dividing Range gives rise to the only considerable river on the continent, the Murray-Darling.

The Murray-Darling

The source of the Murray River is in the western face of the Australian Alps, at the union of the two lateral spurs by which it is flanked on the east and west, about 20 or 30 miles north of Mount Kosciusko, whose peak (7300 ft.) marks the culminating point of the great southern Cordillera. It flows south between these spurs or mountain ranges, skirting the north-western base of Kosciusko, where it sweeps towards the north-west. The head of the upper valley of the river is characterised by the presence of a network of tributary streams or feeders spreading out like the branches of a great tree, through whose sharply-sloping and precipitous channels the thawed waters of the snow-capped ranges sweep in mighty torrents to the lower regions of the valley. The aspect of this part of the country is wild and rugged; heavy snow-storms, violent gales, and blinding sleet being the ruling climatic features of this great Alpine chain, whose western and northern waters cut deep into the rocks forming steep and precipitous gorges, yawning

chasms, and tortuous channels, ever deepening by the erosive action of the troubled waters of many streams.

The Murrumbidgee, one of the tributaries of the Murray, is little inferior to that stream itself. Emanating from its source in the elevated tableland at the base of Peppercorn Hill, some 5000 feet above sea-level, it traverses a tract of country possessing some remarkable features of natural beauty, especially in its upper valley, where the mountains are steep and rugged, and the lateral valleys deep and precipitous. Below this region the river flows through the celebrated Riverina district, where its flood waters often spread out over large level areas in the neighbourhood of numerous shallow water-courses which act as local distributors. In seasons of severe drought it is nearly dry in some parts of the channel. Its principal affluent is the Lachlan, a stream of about 700 miles in length, rising in the rugged western spurs of the Great Dividing Range, north of Lake George. The highest part of its basin is about 3000 feet above sea-level, where snow seldom falls in sufficient quantities to materially influence the flow of the river. The lower valley embraces long stretches of level plains, interspersed with belts of stunted gum, mallee and salt-bush; and in dry seasons the channel of the stream is indicated by a mere chain of water-holes with outspread arms of unequal length that extend far and away to sources remote from the parent stream.

The River Darling drains the western and southern waters of the Great Dividing Range. Including its longest tributary, the Culgoa or Condamine, whose source is in the western flank of Wilson's Peak (4032 feet) near Killarney, the total length of the Darling is about 1953 miles to its junction with the Murray at Wentworth.

J. P. THOMSON.—*Proceedings and Transactions of the Queensland Branch of the Royal Geographical Society of Australasia*, vol. x. Session 1894-95.

"Nowhere in Australia will a shower of rain effect a transformation more rapid and complete than in Riverina. One week there is a barren waste stretching league upon league, the next a thick green

carpet of succulent herbage. If Riverina bore such a crop everywhere the pastoralists would be rich, and salt-bush would be a despised plant by comparison. Along the banks of the water-courses, that not long since were merely dry depressions in the land, wild melons are springing and spreading so rapidly as to give the place the appearance of a garden."—DONALD MACDONALD.—*Gum Boughs and Wattle Bloom*. Cassells.

In Queensland we have the transition from temperate to tropical. There are three well-marked natural divisions.

Natural Divisions of Queensland

The colony is naturally divided into three divisions, each adapted to its peculiar industry. Parallel with the eastern coast runs a high range of mountains, from 20 to 100 miles from the sea, a continuation of the Great Australian Alps and of the Blue Mountains of New South Wales. Between this range and the ocean we find a wide belt of alluvial soil, through which meander many fine rivers and their tributary streams. Beyond the coast range is a vast tableland, with its level or gently undulating plains stretching away, like the vast prairies of America, to the illimitable horizon. These three well-defined divisions are each devoted to different industries.

The alluvial coast lands are given over entirely to agriculture and timber-getting. The banks of the river were, before the timber-getter and the farmer made their appearance, clothed with a luxuriant growth of timber. For centuries the decay of leaves, of trees, and of succulent plants had been forming layer upon layer of the richest mould. The frequent recurrence of heavy floods had assisted its formation by leaving, on their retreat, deep deposits of rich sediment. Within the shadow of these scrubs no grass grew; only stray rays of sun found their way through the tropical luxuriance of the trees, lianas, orchids, etc., which everywhere abounded. But wealth was soon to be drawn from them. The stately Moreton Bay pine-tree, the noble red cedar, and

the imperishable beech, grew to enormous size on the borders of the rivers. These were soon discovered, and saw-mills sprang up in all directions. The expiring sigh of the last tree, as it fell to the lumberer's axe, was the signal for the farmer to step in. With axe and brand the jungle was quickly removed, and maize, tobacco, and cotton fields soon added another charm to the already beautiful rivers. Boats and steamers began to ply on the hitherto unploughed waters, and agriculture grew and flourished.

Across the range, which towers to a height of over 3000 feet, a different sight meets the eye. The basaltic plains of the tableland are covered with a luxuriant growth of nutritious grasses. Men, famous in the older colonies among sheep and cattle, took possession of the solitary wilds, and the face of the land is to-day dotted with flocks and herds.

In 1858 a new era was heralded in by the discovery of gold in the coast range. At this magic word the third great division resounded with the busy hum of men. From that day to this the ranges have been the home of a numerous and wealthy mining community.

A. J. BOYD. — *Queensland: Its Resources and Institutions*. Official Handbook prepared by the Queensland Government for the Colonial and Indian Exhibition, 1886.

In the mountain forest of Queensland we get our first glimpse of the luxuriance of vegetation as we approach the tropics.

Mountain Scenery of Queensland

In the Bunya mountains is to be found the most unique scenery in Southern Queensland. These remarkable mountains, with their singular, bald summits, are really part of the Main Range, but their altitude is nearly twice as great as the bold escarpments around Toowoomba. Mount Mowberlan ("the Bald Head") is the highest, being

3600 feet above the level of the sea. The wide plains and grass lands around Jimbour and Dalby run like a green sea to their base, from which they rise dark and splendid against the sky. Belts of silver-plumed brigalow, with their black branches showing in charming contrast, relieved by the waving tresses of the myall and the sombre foliage of the belar, are passed through as you draw nearer the hills. Now and again you enter a tiny green plain, or natural paddock, which the brigalow has fenced on four sides with walls of silver, or drive through some rushing water-course, with the current boiling round the horses' girths. Although the mountain bridle-tracks are steep they are quite practicable on horseback. Centuries old, and towering 200 feet above you, their topmost branches massed with orchids and lichen, rise the huge russet brown columns of the bunyas, the ringed, majestic heights of the hoof pine, and the smooth white pillars of the beech, 100 feet without a limb. Festoons of brilliant creepers and the thick cordage of the scrub-vine swing overhead. From the leaves of grey dead trees hang flakes of brown and sage-coloured moss. You pass down avenues of white and yellow orchids, past beds of arum lilies, and between dark green walls of scrub myrtle, or through a miniature forest of graceful tree-ferns. Here the moss-covered trunk of some fallen cedar-giant shows amid a rambling mass of wild raspberry bushes; there a huge Moreton Bay fig-tree spreads a leafy shade over the track, its hollow trunk a network of grey cable, inside which a man can climb for 40 feet. Suddenly the scrub will end abruptly and you find yourself on a grassy promontory, looking down some precipitous timber-shoot, with a stretching vista of purple hill and yellow plain beyond. Then you plunge into the scrub and climb upwards once more.

The bold green summit of Mowberlan rises out of a girdle of magnificent forest, rich with variegated foliage, rimmed with a belt of yellow wattle, behind which, in huge masses and serried lines, stand the great bunya trees.

Here, from time immemorial, the dusky generations of a primitive people have come and gone, unknown, unheeded. Here, they were wont to hold their feasts and festivals when the bunya-trees were heavy with harvest. On many of these huge trees, 15 and 20 feet in circumference, you can still find traces of steps cut by generations long since passed away. The eye can sweep the horizon for 40 miles on four sides. Looking over the Darling Downs watershed, past the serried lines of dark forest far below you, the bold heads and rough shoulders of the hills sink away in steep falls and flowing line to the low wooded levels beneath. By the dark foliage of the belar, you can trace the course of six or eight tributary creeks, winding on their way to the Condamine, whilst afar, yellow in the sun, stretch the plains of Jimbour. That cluster of silver dots in mid-landscape is Dalby, with the open forest behind it, and the wide levels of Cecil plains beyond. Those dim blue phantom clouds are Mount Moriah and Mount Russell, whilst far to the south rises Gowrie Mountain, with the plains that gird its base. Turning to the Nanango watershed the scene changes to a tumultuous expanse of densely-wooded summits and vales. The light and shadow play on them is wonderful; a land of cool, deep purple mountain hollows, and rugged gold-smitten mountain crests.

E. EVANS.—*The Garden of Queensland*. Published by the Queensland Government.

For the Cecil plains, the finest sheep country on the Downs, still retaining the old indigenous grasses, and still teeming with game, see *ibid.*, pp. 79-81.

The agricultural possibilities of such country are great.

Fruits of Tropical Queensland

Much of Queensland's vast territory is within the tropics. The fruits which do well are the banana, pine-apple, mango, bread-fruit, jack-fruit, orange, lemon, lime, citron, shaddock, coco-nut, and date palms, durian,

mangosteen, alligator or avocado pear, persimmon, custard apple, papaw—in short, any that are common to the tropics. There are very extensive stretches of country near the coast within the tropics where the wild banana flourishes. When the jungle and rich tropical vegetation are hewn down by the woodman, to get it in readiness



PINE-APPLE FIELD, QUEENSLAND.

for burning, a dense plantation of wild banana springs up rapidly, completely hiding the mass of fallen timber, and giving the clearing the appearance of a banana plantation. Where the wild banana flourishes cultivators can have no difficulties with the better-known varieties of that valuable and nutritious fruit. The sago and date palms would answer in localities where groves of indi-

genous palms now flourish. Along the sea-coast the coco nut may be grown to any extent. Between 17° and 19° S. latitude there is a vast extent of hilly country clothed with tropical vegetation of all kinds, having a fertile soil and enjoying a heavy rainfall, which must eventually become the garden of Northern Queensland.



ARROWROOT FIELD, QUEENSLAND.

The banana, ginger, pepper, nutmeg, and numerous other fruits are indigenous there, and the vegetation of the place is so rich and varied, that it is a paradise for the botanist. The coffee and tea shrubs would grow to great perfection, and so also would vanilla, cinnamon, allspice, cloves, nutmegs, and other tropical trees and spices. As far south as Mackay, pine-apples are sometimes grown

from 12 lb. to 30 lb. weight, and even farther south, near Rockhampton, the smooth-leaved or Cayenne pineapple is often grown from 10 lb. to 14 lb. in weight, and bananas in great perfection.

T. WRIGHT.—*Queensland: Official Handbook for the Indian and Colonial Exhibition*, 1886.

Sugar-Planting in Queensland

The country round Mackay is a dead level alluvial plain, for 10 or 12 miles, and is all under cultivation for sugar-growing. The sight of the cane-fields was very refreshing after weeks at sea. There are few prettier plants than sugar, and the panorama of the Mackay cane-fields is really beautiful. For miles the cane stretches away in a level sea of emerald green, here and there a tall brick chimney rising up to indicate the whereabouts of a mill. A broad belt of dark green forest marks the course of the Pioneer, winding through the plains, and beyond this again are cane-fields right away to the base of rugged mountains, thickly wooded to the very summit. All along the horizon the mountains of the coast range are piled one behind the other in dark-blue masses, their outline rising here and there into sharp peaks against the western sky, and 40 miles away towers the mighty form of Mount Dalrymple, over 4000 feet high, the second highest mountain in Queensland. On both banks of the Pioneer, at intervals of a few miles, are the residences of the planters, and certainly the lines have fallen to them in pleasant places. Their houses, as a rule, are extremely comfortable, and the gardens of many of them are paradises of beauty.

HON. H. FINCH HATTON.—*Advance Australia*. W. H. Allen and Co.

By permission of Messrs. W. H. Allen and Co.

The pastoral regions of the Darling Downs may be compared with pastoral regions in Canada, New Zealand, Victoria, and New South Wales.

The Darling Downs

The Darling Downs consist of a volcanic plateau rising 1400 to 2000 feet above sea-level, and situated about 100 miles from the eastern coast-line. To north and east the Bunya Mountains and Great Dividing Range, and to the south the broken mountain regions on the New South Wales border encompass it with ramparts of purple. On its unenclosed side the ground falls away gradually to the western plains. The Condamine, rising in the Killarney ranges, and running north-west, sweeps diagonally through it, fed by scores of tributary creeks, and drains the whole basin for more than 100 miles before it leaves the Downs country with a westerly curve.

The area of this beautiful tableland is over 4,000,000 acres of rich black, red and chocolate soil, 4 to 60 feet deep. The country, consisting of immense open plains and undulating downs, is diversified by gently sloping ridges timbered with apple-tree and gum-topped box, rich alluvial valleys and apple-tree flats, stretches of open forest and belts of scrub. The scrub lands on some of the mountain slopes are also exceedingly rich, the deep red and chocolate soil frequently reaching to the summits. On the crest and shoulders of the Main Range, stringybark, black-butt, turpentine, bloodwood, hoop, and bunya pine are to be found in large quantities, whilst the scrubs are composed of brigalow, ti-tree, myall, sandalwood, wild apple, fig, honeysuckle, interspersed with clumps of pine, cedar, beech, iron bark, and other timbers. This expansive tract is well watered by numerous mountain streams and running creeks; but water can also be obtained by sinking at depths varying from 15 feet to 150 feet. The climate is temperate, resembling the Riviera. The summer lasts six months, but the nights are cool and bracing. There is no winter in the European sense, but during June, July, and August there are ground frosts and searching westerly winds. November

and December is the period of thunderstorms; whilst from January to the end of March is generally the wet season. There have been two falls of snow in the last twenty years. The rainfall average is about 30 inches, the most favoured localities being along the rain belt within a radius of 20 miles of the Main Range. The district is chiefly supported by the pastoral and agricultural industries, though there is a considerable trade in timber, and some mining. The mild temperature enables all crops, vegetables, and fruits of semi-tropical and temperate climes to be grown; whilst the soil, being composed of decomposed matter and drift, cannot be surpassed for agricultural purposes.

I will assume that you are a visitor, anxious to be shown over the Darling Downs. I have met you in Brisbane, and, catching the Sydney mail train at 7.30 A.M., we arrive at Toowoomba, capital of the Downs (101 miles from Brisbane) at 12.25 P.M. Many handsome villa residences cling to the bold brows of the Range, overlooking a tumultuous sea of mountain summits, but the town proper is built along a beautiful, well-watered valley, and up the gentle acclivities to the west. For the last three-quarters of an hour we have been through some wonderful scenery. "The train travels round serpentine curves, along deep cuttings, across iron bridges, vanishes suddenly into short, dark tunnels, from which it as suddenly emerges into the sunlight, rising ever higher and higher, until the traveller looks out far across a vast amphitheatre of broken ranges, like the enormous waves of some primeval ocean. Far off, across the infinite blue, the eye beholds Cunningham's Gap, as though some giant smote the mountains asunder to make a pathway for that lonely pioneer. Range rises beyond range until in the remote distance the dim peaks are like blue clouds floating in the horizon." The train leaves at 12.45, and we are speeding over the magnificent Downs, dotted with homesteads, and chequered with multi-coloured squares of

cultivation towards Warwick, which we reach at 3.30 p.m. (68 miles from Toowoomba by rail). Leaving Warwick, a run of 38 miles brings us to Stanthorpe, the centre of a fine mining, grazing, and fruit-growing district, and thence on to Wallangarra on the New South Wales border, 490 miles from Sydney, and 233 from Brisbane. Here we let the mail train proceed to Sydney without us. I will show you a bird's-eye view over the whole Darling Downs country.

Let us assume that, having ascended to the height of 1000 feet, we are floating over the Ballandean and Accommodation Creek orchards, where all English fruits are grown to perfection. Cooking pears, $1\frac{3}{4}$ lb. in weight, and cooking apples 15 inches in circumference have been produced here. Away to the west we see the farms round Texas on the Severn, and farther to the north-west, the cultivation round Inglewood, at which places tobacco has been grown with success for some fifteen years. To the east we see the Sugarloaf settlement, and to the west the broken country round Pikedale, where silver and copper mining is carried on. We are now looking down upon the town of Stanthorpe, with its countless green orchards, once the centre of the tin-mining industry, and surrounded by about 550 square miles of mineral country. The town is also the centre of an extensive pastoral country, many of the sheep runs being famed for the fineness of their wool. Altering our course to the north-east, across a tract of mountainous country, we reach Killarney, about 20 miles from the head of the Condamine, the terminus of a branch line from Warwick, which runs through some of the choicest agricultural land on the Downs. Formerly the rich black soil slopes and flats which surrounded it were nearly all dense scrub, but now the land is cultivated right up to the New South Wales border. Some of the mountain country at the back of the village is heavily timbered with pine. There is close settlement and intense farming on all sides. The scenery is exceedingly picturesque. The



HARVEST-FIELD ON THE WARWICK DOWNS, QUEENSLAND

scenery up the gorge of the Condamine is of wild grandeur, and the river has to be crossed nineteen times in 8 or 10 miles. Heading north-westerly, we are now passing over the magnificent Canning Downs estate. We are in the very heart of a farming country of great importance, supporting thousands of settlers. Hemmed in on three sides by mountains at the base of which lie some of the richest agricultural land in the colony, the country may be described as undulating downs and open forests, rich flats, and valleys. It runs within half-a-mile of Warwick, the centre of all those surrounding settlements. The soil is deep alluvial along the valleys, whilst the uplands are composed of red-coloured volcanic matter. To the north-east are the old-established farming settlements, a succession of fertile valley-lands and gradual slopes, surrounded by a dark range of hills. Nearly all these lands were once unreclaimed scrub, thought to be useless by the early settlers, who took up the grass country. Now the beauty of these valleys with their neat homesteads and well-tilled farms, waving with golden grain or green lucerne, which spread like a chessboard around the foothills, or climb the adjacent acclivities of the purple mountains, is indescribable.

E. EVANS.—*The Garden of Queensland*. Published by authority of the Queensland Government.

The imaginary voyage extends much farther, and is described in detail, pp. 26-86, including many of the most prominent stations.

It was from the top of Mount Sturt, in 1827, that Allan Cunningham, the botanist, and discoverer of the Darling Downs, who had made his way thither from the Hunter River, across the Liverpool Range, round the eastern skirts of the Liverpool Plains, and across the New England Range, all country of the most difficult description, had his first panoramic view of the rich region into which he was the first to penetrate. Cunningham's Gap, the only visible means of crossing the mountain barrier towards Moreton Bay, was traversed in the following year.

Sheep-Shearing on a Queensland Sheep Farm

Sheep-shearing on an Australian station is the great event of the year. On any large and well-managed

station there is a substantially-built wool shed, the most approved pattern for which is **T**-shaped. The shed should be high, airy, and large enough to hold sheep for a whole day's work. Let us suppose there are 200,000 sheep to be shorn; if the shed is capable of holding them, sixty or seventy shearers will be at work, besides several other men as assistants, so that often a hundred hands are employed. It is impossible to shear sheep that are damp, and unless the shed will hold enough sheep to make weather a matter of indifference, a single thunder-storm may keep all the hands idle for a day or even more, to say nothing of the dew, which, unless enough sheep are housed overnight, will often delay operations for a couple of hours every morning. The usual practice is for the sheep to be driven in over night, until the shed is full. The work is all done at so much a score, and ninety sheep a day is about an average record for a good man. The men stand on what is called the shearing floor. On one side is a pen of unshorn sheep from which they catch, while a few yards distant is the door through which the beast runs when shorn; and by the shearer stands a boy with a brush and a pot of tar, to rub into any bad cut which may be inflicted in the hurry of taking the wool off. Other men pick up the fleeces, fold them, and put them in bales, when they are pressed, and sometimes "dumped," that is, subjected to hydraulic pressure to make carriage easier. On a large station on the Darling Downs sixty or seventy bales go away by rail every day during the whole shearing, all ready for shipment to England by the first steamer.

A. W. STIRLING.—*The Never Never Land*. Sampson Low.

By permission of Messrs. Sampson Low.

A Queensland farm is thus described by the same traveller. "The post came once a week, by sending 15 miles to fetch it. The house was quite in the bush style, with wooden sides and an iron roof. Living consisted of mutton and damper, washed down by tea at each meal. The country was of the best description, magnificently grassed with the Mitchell grass. This grass springs in tufts, often covering the ground to the height of a foot or more, and its great virtue

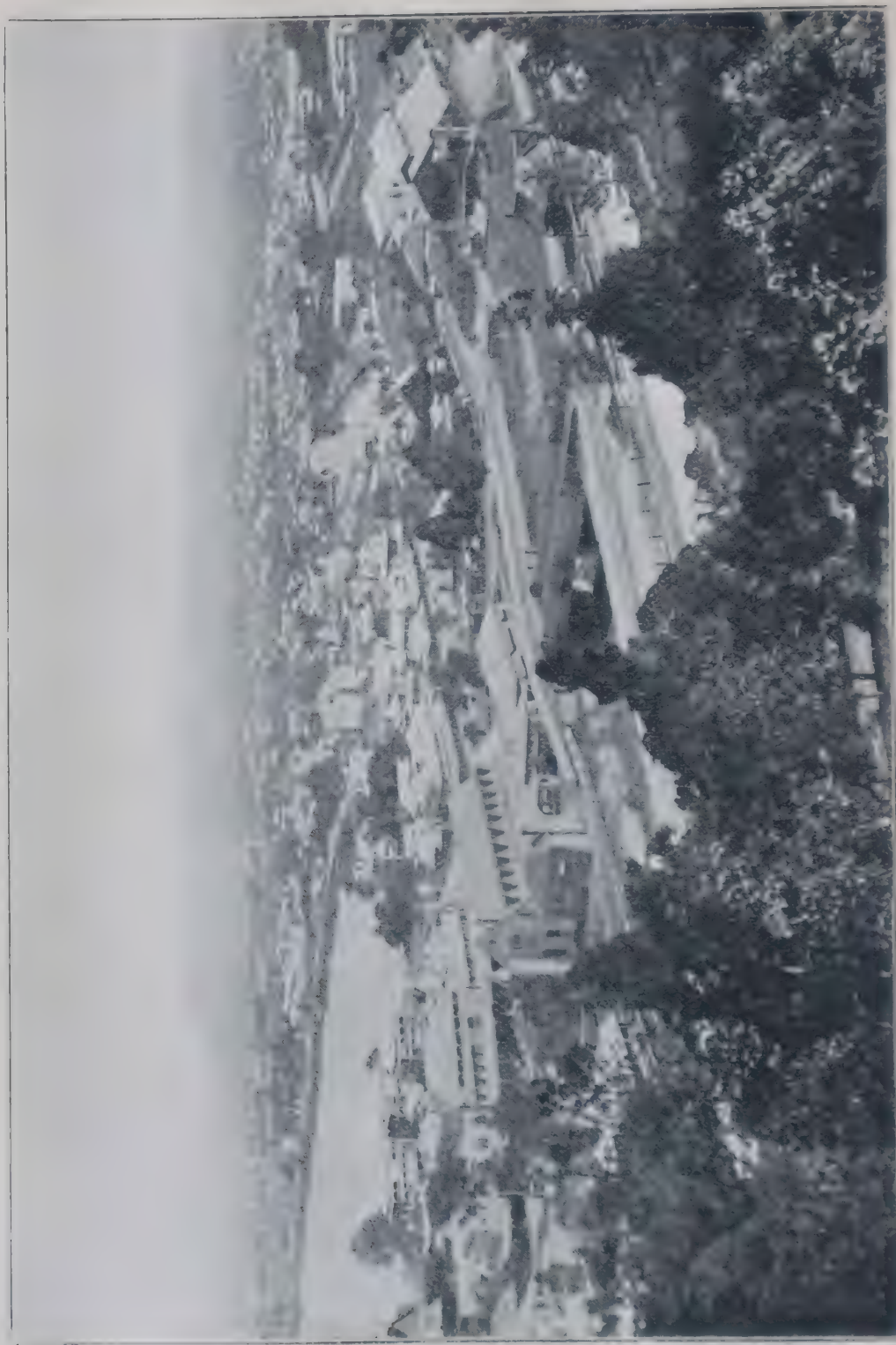
lies in the fact that even in the driest season, unlike the finer kinds of herbage, it affords good sustenance to the sheep. A variety of the famous salt-bush, so prized by the sheep-farmer, grew in profusion. This shrub forms in many places the staple food of the sheep. In country where there is no variety of salt-bush it is necessary to give the sheep a substitute in the form of rock salt. The chief virtue of the salt-bush is its capacity for resisting drought; long after the last vestige of grass has turned to dust, the salt-bush remains, and the sheep thrive upon it, so that the squatter looks upon it as a sure stand-by even in the worst time."—*Ibid.*

Gold-mining is also important. The capital is Brisbane.

Brisbane

Originally built on a flat, partly enclosed by an abrupt bend of the river, the town has climbed the bordering ridges, crossed the stream, and spread out in all directions. The principal street, Queen Street, runs across the neck of the original riverside "pocket"; at one end it touches the wharves, at the other it meets the winding river at right angles, and the roadway is carried on by a long iron bridge across to the important suburb of South Brisbane. Queen Street possesses shops and bank-buildings which may challenge comparison with those of any Australian city, and every year the older buildings are giving way to newer and more imposing structures. On one side of the thoroughfare the cross streets lead through the oldest part of the city; through blocks of buildings where fine warehouses and tumbledown hovels are strangely intermixed with the Parliament Houses, the public gardens, and the wharves. On the other side of Queen Street the same cross streets climb steep ridges to the terraces, where high and broken ground offers cool, breezy sites for streets filled with dwelling-houses.

An artist roaming round the town would find objects of interest everywhere. From the elevated terraces he could look down upon the main town, with the river, a broad band of silver winding through it, and his horizon would include the blue peaks of the Main Range to the



westward, and the shimmer of the sunlight on the great landlocked sheet of Moreton Bay to the eastward.

H. WILLOUGHBY—*Australian Pictures*. Religious Tract Society.

By permission of the Religious Tract Society.

“Brisbane, with its wooden houses all painted white, and the trellised verandahs round about them, some with grape vines and passion fruit clustering it, and the dripping tattered fringe of a banana-tree growing round the end, is picturesque after the first shock is over,—the first shock of eternal glare, dry dust, and white or sea sand, and fields of caked earth instead of grass.”—HUME NISBET.—*A Colonial Tramp*. Ward and Downey.

South Australia is fertile for some distance inland from the coast. Agriculture is important in the well-watered districts, and sheep-keeping in the salt-bush country.

South Australia

A fine rich plain stretches eastward from the coast till it is intercepted by a succession of hills known as the Mount Lofty Range, and beyond this broken country occur other wide undulating plains called the Murray Flats, which slope down towards the Murray River. The Mount Lofty Range, as it goes northwards, merges into the Flinders Range, which gives place in turn to other ranges, altogether extending hundreds of miles up the centre of the province. This mountain range forms an extensive watershed, and numerous watercourses, more or less permanent, flow from the hills and fertilise the lower lands. For years past the coast plain has been under cultivation. For many miles you travel through a succession of farms. Here and there are farmer's homesteads, with an occasional more pretentious building, indicating the residence of one of the gentry. Dotted over the plains, too, are the towns and hamlets, in some of which may be observed the conveniences, and even the elegancies, of city life. Some portions of the mountain range are very fertile, and numerous orchards and vegetable gardens, besides ordinary farms, may be seen

on the hillsides, or nestling snugly in the rich valleys. The Murray Flats are rapidly being brought under cultivation. The Far North consists largely of myall or salt-bush country. This country is of a lacustrine character, many of the lakes being of great extent, others forming chains of lagoons or waterholes. Almost all the lakes are salt and low-lying, Lake Eyre being over 30 feet below sea-level. West and north-west of Lake Eyre the country rises to a considerable elevation, the Musgrave and Macdonnell ranges being several thousand feet above the sea. The whole of this Far North country, lying north, east, and west of Port Augusta, is only suitable for pastoral or mineral occupation. Lying between the River Murray and the Victorian boundary is a large area known as the South-Eastern District. Wide tracts of this district comprise sterile sandy land of little use even for pasturage, but here and there are spots of great richness. These have been eagerly selected, and have proved the centres of thriving agricultural populations. This district was formerly volcanic, and the craters of extinct volcanoes are a feature of the district.

J. F. CONIGRAVE. — *South Australia: A Handbook for the Colonial and Indian Exhibition, 1886.*

Agriculture in South Australia

A visitor to the colony in October and November will be impressed with the extent of waving fields of golden corn, which, in all directions, on the broad open plains, or on the undulating uplands, or in some quiet nook in the hill ranges, meet his eye. The agricultural year begins immediately after the autumn months. In March or April the early rains fall, and ploughing is very general during April, May, and June. The intense heat of summer hardens the ground so that ploughing is difficult and costly prior to the advent of the rains. Immediately, however, that the first showers have fallen, the farmer commences ploughing, and is busy with his

teams from morning till night. Sowing is begun in April, May, or June, and as a rule is completed by July. The principal rains fall in June and July; in August, as the days lengthen, the crops shoot up, and in the next two months they seem to grow like magic. As the month of November approaches the crop begins to show for ear. Hay harvest is in full swing by the middle of November, the corn harvest following immediately afterwards. Hay is made in South Australia of the wheat plant, mowed just as the wheat is forming in the ear, and dried for a few days in the sun. By the beginning of December, reaping operations have fully set in, and by Christmas harvest is general throughout the colony. Wherever you go in the farming districts you may see the strippers at work, rapidly stripping the heads of the ripe corn, and hear the remarkable humming noise made by the rapid revolution of the beaters, which brush out the wheat from the growing crop.

J. F. CONIGRAVE. — *South Australia: A Handbook for the Colonial and Indian Exhibition, 1886.*

Much of South Australia, however, is sandy or stony desert such as we have not yet seen in any other part of the empire.

In the Australian Desert

From the level we ascended to sandy and grassy plains as before. But they were now bounded by sandy ridges of a red colour and partly covered with spinifex. Ascending one of them we found that it was flanked on both sides by others; the space between the ridges being occupied by the white and dry beds of salt lagoons. The very aspect of these dreaded deposits withered hope. It was now sunset, and we had journeyed upwards of 34 miles. I halted for the night at a puddle, rather larger than that of the night before, but with sorry feed for our horses. At this place we dug our second well.

The following morning, about a mile from where we had bivouacked, we arrived at the termination of the sandy ridge and descended into the plain. One would have supposed from its appearance that it was a sea marsh. At $6\frac{1}{2}$ miles we ascended some heavy sandy ridges. Toiling over these, at 7 or 8 miles farther, we sighted a fine sheet of water distant about 2 miles, which proved to be a lake from 10 to 12 miles in circumference. The ridge by which we had approached it terminated suddenly and directly over it: to our right there were other ridges terminating in a similar manner, with rushy flats between them; eastward the country was dark and very low; to the north there was a desert of glittering white sand in low hillocks, and on it the heat was playing as over a furnace. Immediately beneath me to the west there was a flat leading to the shore of the lake, and on the western side a bright red sandhill, full 80 feet high, shut out the view. This ridge was not altogether $1\frac{1}{2}$ miles in length, and behind it there were other ridges of the same colour, bounding the horizon with ridges as sharp as icebergs. As we approached the water the effluvia from it was very offensive, and the ground became a soft, black, muddy sand. On tasting it we found that the water was neither one thing nor the other, neither salt nor fresh, but quite unfit for use.

I was afraid of entering on the scorching sands in our front, for we were now fully 90 miles from the creek; and it was absolutely necessary, before we should exceed that distance, to find a more permanent supply of water than the wells we had dug on our way out. I ascended the rugged termination of the sandy ridge, close to which we had been riding, and from what I saw, determined on a course somewhat to the west of north. Descending, therefore, I went 6 miles before coming to a small puddle at which I was glad to halt, it being the only drinkable water we had seen. Here we dug a third well. On the morning of the 17th I thought it prudent to search for water, and as the country appeared open to the south I

turned to that direction. We crossed some low sandhills to a swamp in which there was a good deal of surface water, but none of a permanent kind. We then crossed the north-west of an extensive grassy plain. It continued for many miles to the south, passing between all the sandy points jutting into it, and so closely was the desert allied to fertility at this point, that I stood more than once with one foot on salsolaceous plants growing on pure sand, with the other on luxuriant grass, springing up from rich alluvial soil. I was sure that water was not far off, and at length we found a small, narrow, and deep channel of but a few yards in length, hid in grass. The water was about 3 feet deep, and was so sheltered that it would last ten days or a fortnight. The plains extended for miles to the south-east, with an aspect of great luxuriance and beauty, nor could I doubt they owed their existence to the final overflow of the large creek we had all along marked trending down to this point. Such, indeed, I had felt from the first, even when I looked on its broad and glittering waters, would sooner or later be its termination, or that it would expend itself less usefully on the Stony Desert. As yet, however, there was no indication of our approach to that iron region. We next pursued a north-north-west course into the interior, and soon left the grassy plains, crossing alternate sand ridges and flats. About noon we crossed a plain, partly covered with stones and partly bare, and at the farther extremity of it passed through a gorge between two sandhills into another plain that was barren beyond description, with only salsolaceous herbs. It was surrounded on all sides by sandhills of a fiery red. From this plain we again crossed alternate sandhills and flats, the former covered with spinifex, the latter being quite denuded of all vegetation. I halted at the only puddle of rain water we had seen since leaving the grassy plain. We here dug a fourth well. We resumed our journey on the former bearing, the wind blowing keen from the south. At $1\frac{1}{2}$ miles we reached a salt lagoon as it

appeared to be in the distance, but which proved to be rather a flooded plain. We had an immense barren plain to our left, bounded all around by sandhills. Over these we toiled for 9 miles, and at $5\frac{1}{2}$ miles farther, having previously crossed a small stony plain, succeeded by sandridges and valleys, both covered with spinifex, we ascended a pointed hill that lay directly in our course, and from it beheld the Stony Desert almost immediately beneath our feet. Coming so suddenly on it, I almost lost my breath. Herbless and treeless it occupied more than one-half of the visible horizon.

CAPTAIN CHARLES STURT.—*Narrative of an Expedition into Central Australia.* Boone.

"The ground was thoroughly heated to the depth of 3 or 4 feet, and the tremendous heat that prevailed had parched vegetation and drawn moisture from everything. Every screw in our boxes had been drawn, and the horn handles of our instruments, as well as our combs, were split into fine flakes. The lead dropped out of our pencils, our signal rockets were entirely spoiled; our hair, as well as the wool on the sheep, ceased to grow, and our nails became as brittle as glass. We found it difficult to write or draw, so rapidly did the fluid dry in our pens and brushes."—*Ibid.*

"I remember Captain Sturt telling me, on his return, that the sands were so hot that if a lucifer match were let fall on them it instantly took fire."—J. B. JUKES.—*A Sketch of the Physical Structure of Australia.* Boone.

"The arid nature of the interior country, and the semi-tropical heat which prevails during the greater portion of the year, have made communication with this distant country very difficult. The interior transport trade is done almost entirely by camels. They have been known to travel 25 miles per day for nine successive days, under a tropical sun, and heavily laden, without a drink of water, and no other feed than that furnished by the scanty bushes. The first great national work on which camels were employed was in the construction of the Adelaide and London telegraph line in 1872, to carry wire, insulators, etc. During the severe drought of 1881 a large number were the means of saving the lives of the starving population of the Albert gold-fields in New South Wales. In South Australia they are harnessed to waggons like a team of horses, eight of them taking four tons and travelling 15 miles a day."—J. F. CONIGRAVE.—*South Australia: A Handbook for the Colonial and Indian Exhibition, 1886.*

The drivers are frequently Afghans.

The capital of the Colony is Adelaide.



ADELAIDE.

Adelaide

Adelaide is situated upon a wide stretching and fertile plain, commanding at many points a fine view of the Gulf of St. Vincent to the west, and shut in on the south and east by a magnificent amphitheatre of hills. Adelaide is justly noted for its picturesqueness and beauty. It is divided by the river Torrens into two parts, South Adelaide, which is the business part of the town, and North Adelaide, which is mainly residential, and between these two divisions there is a large area of reserved or park lands, through the centre of which runs the river. The whole city is also environed by an extensive belt of park lands.

J. F. CONIGRAVE. — *South Australia: A Handbook for the Colonial and Indian Exhibition, 1886.*

“Landing here in the height of a scorching summer, with the blue waters of the sea lapping against a low-lying flat of land, stretching to the higher ground of the city beyond; this, dusty and parched, covered in parts with the prickly pear and other dull green vegetation peculiar to hot, dry parts, and lit up here and there with brilliant scarlet and other bright blossom, one might imagine they had landed at some port of Northern Africa. Farther beyond the city, with its wide streets and splendid gardens, green and beautiful even beneath the rays of this scorching sun, covered with thick vegetation, a background of dark-blue hills rises into the hazy blue of the summer sky.”—E. H. CANNEY.—*The Land of the Dawning.* Remington and Co.

Western Australia, like South Australia, is a desert, except on the coastal strip. Its development has been slower than that of the more favoured colonies. The tide turned with the discovery of gold-fields of enormous wealth on the margin of the desert.

Gold in Western Australia

Rip Van Winkle could scarcely have been more astonished than the traveller who, conversant with the fields in 1893, 1894, revisits them to-day. Towns have risen, flourished, and passed away. But a few short years

ago the weary projector trudged sturdily on through the sand and scrub of the desert, with nothing certain but the heat, and dust, and thirst, towards a possible Eldorado. To-day, the traveller in the west makes that same journey in a well-appointed express train, not in search of problematical gold-fields, but to view what is perhaps the richest belt of country in the world. The hardships of camp life have given place to the comforts of a good hotel; instead of the sandy tracts there are the properly made and brilliantly lighted streets of a modern city, rising like a creation of the genii out of a waterless and barren desert; and the windlass and bucket of the prospector have given place to the latest and most elaborate scientific gold-mining machinery.

Although mining operations are being carried on at many other places in the colony—Southern Cross, Coolgardie, Kanowna, Menzies, and all that district, Murchison, Pilbarra, Kimberley—the headquarters of the industry are at Kalgoorlie. Limited in area to about 600 square miles, the East Coolgardie field is unquestionably supreme amongst the gold-fields of Australasia, and in auriferous wealth is probably richer than any equal area of country in the world. It is almost impossible to convey in words anything like an adequate idea of the magnitude of operations. Practical acquaintance is necessary, and for choice that should commence at night. Proceeding from Coolgardie, across the intervening desert, there suddenly looms up out of the surrounding darkness a brilliantly lighted patch, apparently a distant view of a large and prosperous city. Within the compass of these lights, however, is the famous Golden Mile of Western Australia, from which is annually procured, not only more gold than from all the other fields of the colony combined, but more than the output of any other State in Australia, Queensland only excepted. From one mine alone, and that by no means the largest, the Golden Horseshoe the monthly return is 15,000 ounces. A personal visit to any of the large mines reveals the fact that here mining is more than

manual labour and mechanical process. Upon it must be brought to bear some of the greatest scientific discoveries of the world. The old-time manager, whose gold was crushed from the stone by battery, has little place here. The guiding hand must know, and be able to take advantage of, the latest metallurgical processes. This is rendered necessary, as much of the gold is found in the forms of tellurides and sulphides; in fact, to the prevalence of these the richness of the field is in large measure due. As may be expected under these circumstances, the cost of plant is enormous, and the working expenses abnormally heavy; but, notwithstanding that, the dividends paid by the Kalgoorlie mines from 1895 to the end of 1900 amounted to nearly £4,000,000 sterling.

The great drawbacks to development have always been wood and water. The whole district is but lightly timbered; and though, by means of tramways into better-timbered country, the wood supply is keeping fairly abreast of the demand, the total quantity available is by no means inexhaustible. In the near future we must look to coal to provide the requisite fuel, and luckily there is every prospect that the coal industry of the colony will be able to meet the strain that, sooner or later, must be laid upon it. The water difficulty, thanks to the enterprise of the Government, will, within a little time, be practically overcome by the successful completion of the Coolgardie water scheme. The rainfall in the Darling Ranges, which is abundant and certain, is to be stored in a vast dam at Mundaring, and from there it will flow through wrought-iron pipes for a distance of some 350 miles, and finally be delivered on the eastern gold-fields at the rate of something like 5,000,000 gallons of water daily.

J. S. BATTYE.—*West Australia at the Beginning of the Century. Review of Reviews for Australia*, March 1901.

For Kalgoorlie and the Golden Mile, see MISS VIVIENNE, *Travels in Western Australia*, chap. xvii. Heinemann.

New Guinea, separated from Australia by Torres Strait, is partly British.

A Glimpse of New Guinea

Nowhere have I seen more splendid scenery than in New Guinea. As you sail along the coast it is an ever-changing panorama, range behind range of mountains, from the steep grass-covered sides nearest to the sea, with their deep valley and water-courses, and the forest-clad hills behind, to the far distant Owen Stanleys, tier above tier, growing fainter as they tower above and behind one another. In places vast precipices start out as if from the sea, sheer walls 1000 to 1500 feet in height, with those purple masses again receding and melting into mid-heaven.

HUME NISBET.—*A Colonial Tramp*. Ward and Downey.

SOUTH AFRICA

British South Africa lies in the same latitudes as Australia, which it resembles in many ways. The agricultural, pastoral, desert, and tropical zones are all found in South Africa, which like Australia is one of the great gold-producing regions of the world.

Most travellers arrive at Cape Town, one of the most beautifully-situated cities in the world.

Cape Town

A nobler site for a city and a naval stronghold than that of the capital of South Africa can hardly be imagined. It rivals Gibraltar and Constantinople, Bombay and San Francisco. Immediately behind the town, which lies along the sea, the majestic mass of tableland rises to a height of 3600 feet, a steep and partly-wooded slope capped by a long line of sheer sandstone precipices more than 1000 feet high, and flanked to right and left by bold,



CAPE TOWN AND TABLE MOUNTAIN, FROM TABLE BAY.

isolated peaks. The beautiful sweep of the bay in front, the towering flags behind, and the romantic pinnacles which rise on either side, make a landscape that no one who has seen it can forget. The town itself is disappointing. It has preserved very little of its old Dutch character. The miniature canals which once traversed it are gone. The streets, except two, are rather narrow, and bordered by low houses; nor is there much to admire in the buildings.

J. BRYCE.—*Impressions of South Africa*. Macmillan.
By permission of Messrs. Macmillan and Co., Ltd.

From the coast the land rises by terraces, called the Karroos, to the interior plateau or High Veld.

Cape Colony

South Africa has been compared to the half of an inverted saucer, but resembles rather an irregular flight of four steps.

The Coast Plateau, forming the first step, is of irregular width, varying from a few miles to fifty, and averaging about 600 feet in height. The plateau adjoining the West Coast is bounded eastward by the irregular mountains of Namaqualand and by the Olifant and Drachenstein ranges. The South Coast Plateau, of far more importance, is divided from the highlands of the Southern Karroo by the Zondereinde, Lange Bergen, Outeniqua, and Lange Kloof mountains. Farther eastward the plateau loses its former well-defined character, and in some instances, where the base of the mountains is almost washed by the sea, can scarcely be said to exist. The intermediate plateaus of the Southern and Central Karroos are also replaced by confined ranges of mountains and hills connected by long-swelling uplands peculiar to this part of the country.

The chief characteristics of the Coast Plateau are

warmth and moisture. The distribution of the rainfall varies considerably in different seasons, the greater part of the coastline of Cape Colony receiving its rains during the winter months from April to September. The three hottest months—January, February, and March—are almost rainless at Cape Town. The coast-lands east of Port Elizabeth are, however, different. Durban, St. John's, etc., receive most rain in the summer—that is to say, during the same period when the rains are expected in Kimberley, the Transvaal, and the Orange River Colony, the winters being as a general rule dry and clear.

North of the coast plateau the ground rises more or less abruptly to the second plateau—which may be regarded as lying between the Zwaartebergen and the coast range. To the west the rise is gradual. Farther eastward the vegetation and climate partake more of the Karroo character.

In comparing the Southern Karroo climate with that of the coast-lands, a very great alteration is noticeable. The rainfall, except in the mountain slopes, is much less, and the range of temperature is somewhat greater.

After leaving the rich Goundini valley the scenery rapidly changes to bare, uninteresting veld, traversed by deep gullies which in summer are generally dry. In all directions the landscape is bounded by equally barren-looking mountains, whose steep, rocky sides appear from a distance to be entirely destitute of vegetation. Nothing can exceed the contrast between this scenery and that on the opposite slopes of the coast ranges, whence the traveller from the south, after ascending through luxuriant vegetation, frequently clothed in mist, emerges suddenly into a region of precipices and rocks, where rain may not have fallen for weeks.

The soil in the valleys, however, in spite of their unpromising appearance, is extremely rich when it can be brought under irrigation.

Beyond the Zwaartebergen, whose peaks range from

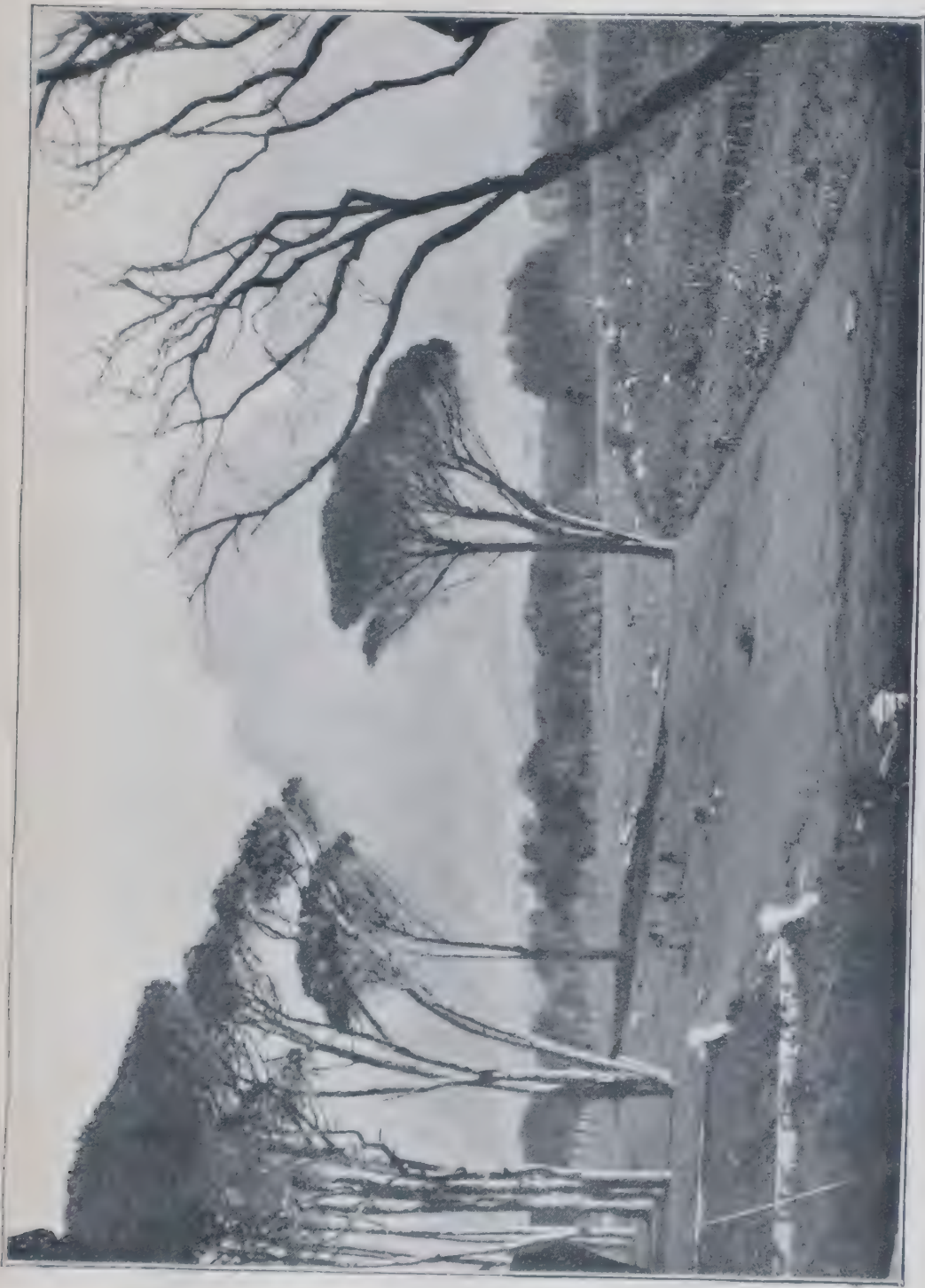


TABLE MOUNTAIN, FROM GROOTE SCHUUR.

5000 to 7000 feet in height, lies the great plain of the Central or Great Karroo, extending east and west for a distance of about 350 miles, at a level of from 2000 to 3000 feet above the sea. Its northern boundary consists of the Nieuwveld and great Sneeuwberg ranges, whose highest peak, the Kompas Berg, reaches an elevation of 7800 feet.

A. S. AND G. G. BROWN.—*Union-Castle Line's Guide*. Sampson Low.

By permission of Messrs. Donald Currie and Co.

The Karroos

The Karroo bush which grows over a large part of this great inland plateau, is an unpromising looking vegetation when burnt up by the rays of the summer sun, but nevertheless, in the driest seasons, it affords nourishment to millions of sheep and goats. Few deserts can have a more desolate appearance than the Karroo districts in summer. Verdure is entirely wanting; the numerous water gullies are nearly always dry, and the low ranges of ironstone kopjes, which dot the plains, seem to reflect the heat as if from a mirror. Yet, provided the water in the farmers' dams holds out, the flocks and herds can find abundant nourishment in the dried-up shrubs. Wherever irrigation schemes have been successfully carried out the land has proved to be marvellously fertile, and should the traveller chance to pass through the country after the spring rains, he will find that the desert has literally blossomed as the rose.

The prevailing summer winds during the day are from the north and north-west, frequently laden with dust, and sometimes bringing in their wake heavy thunderstorms, from which a considerable part of the rainfall is derived. During the night the cool breezes from the south-east generally prevail. The rainfall is scanty, and occurs principally from December to May. In the west the

annual average is about 10 inches, increasing to 18 inches in the east.

Still farther inland is the Northern Karroo, the highest and most extensive of the Cape Colony plateaus, stretching as far north as the Orange River at an elevation of from 2800 to 6000 feet above sea-level. Although spoken of as "Karoo," a Hottentot word meaning a dry place, part of this area is, strictly speaking, veld—that is to say, land where the greater amount of moisture present allows of the growth of grass, instead of the stunted, fibrous rooted vegetation, which alone can find nourishment on the true Karroo during the dry summer months.

The scenery is very similar to that of the Central Karroo, but the plains are more extensive and not so frequently relieved by kopjes. The climate is extremely dry, some parts to the west averaging as little as 2 inches of rain in the year, the average for the whole being about 10 inches, of which the greater part falls in the violent summer thunderstorms. But only a small portion of this amount, slender as it is, is available for agricultural purposes, the great bulk running off the sun-baked soil into the deep gullies which hurry off the much-needed water to the sea.

Agriculture on a limited scale is pursued only in the neighbourhood of the villages, the great industry being cattle and sheep-farming, but the more remote portions are almost uninhabited save by a few wandering tribes of Hottentots and Bushmen.

The climate is similar to that of the Central Karroo region, but the extremes are more accentuated. Sever frosts are experienced in the winter nights—in one instance the thermometer falling as low as 12° Fahr. The summer heats are correspondingly severe, reaching to 110° in the shade; the feeling of oppression being increased by the hot westerly winds, which predominate during the first half of summer, although the nights are cool even during the periods of greatest heat. The

winter days are very enjoyable, the air being keen and bright, with a maximum of sunshine which allows of almost uninterrupted outdoor exercise.

A. S. AND G. G. BROWN.—*Union-Castle Line's Guide to South Africa.* Low.

By permission of Messrs. Donald Currie and Co.

Under the general name of veld many kinds of grazing land are included.

The Cape Colony Veld

The veld is of many kinds. The first distinction is between grass-veld and bush-veld, the former being characteristic of the regions under the influence of the wet summer monsoon, the latter covering the parts under winter rains, but extending along all coast lands, over many mountain ranges, and usually occupying the kloofs and valleys. The Karroo Plain is peculiar, for while what rain it gets falls chiefly in summer, it is covered with bush, grasses only appearing for a short time after rain and on the mountains. The term bush includes a great variety of plants, the short shrubs of the Karroos, the knee-high "boschjes" of the Western Province, the dwarf trees of the mimosa type, and the majestic timber trees of the natural forest. Grasses, too, vary, though not to the same extent, and combinations known as mixed veld are not uncommon.

The veld is known as "groot-vee-veld" (large stock) or klein-vee-veld (small stock), according as it is suited for cattle and horses or for small stock. Every breed of domestic animals has veld specially adapted for it.

Sweet veld is rich land producing nutritious food whether natural or cultivated. Sour veld gives good grazing during certain months, but becomes harsh, dry, and fibrous towards the end of the summer, and is then of no value.



THE LOW VELD.

G. H. HERMAN & CO., INC.

To promote an early growth of young and succulent grass the very general practice of burning sour veld during the dry season has arisen. The propriety of doing so is one of the great questions of the day. Many insist that veld-burning is the only way of removing the old growth, which by sheltering the young vegetation would prevent cattle and sheep from getting at it till it was dry and woody. On the other hand burning materially alters the character of the veld. The more valuable feed appears to be that more easily killed. No doubt the pasturage is improved the first year, but in the second the burnt veld becomes more sour than ever.

The alternative is heavier stocking coupled with resting of the veld at certain seasons to allow the more valuable kinds of herbage to increase. A great advance in this direction is the sub-division of farms into camps and paddocks, thus limiting the stock to certain parts at certain seasons.

A question closely connected with the veld is that of vermin—jackal, lynx, leopard, wild cats and lesser beasts of prey. On this account the almost universal custom of confining stock to the kraal at night has arisen. Every morning the flock must sally forth to the grazing land, returning again at dusk, thus spending much time in travelling to and fro. By the continuous grazing which necessarily takes place no part of the veld is ever rested. Flowers are eaten off and possible seed destroyed. Young plants are nibbled down or tramped out, and bushes are gnawed, especially by goats. In this manner the veld is becoming worn out over wide stretches, and several years of drought have brought matters to a very acute stage. The best remedy is the construction of jackal-proof wire fences, fences round whole farms or groups of farms, within which stock can graze at will, undriven by the shepherd, and allowed full freedom day and night. Sub-division of the farms into camps with ordinary fencing gives the veld an opportunity of resting, and allows the sheep that change of pasture which is so necessary for them. The

system is still in its infancy, but in this direction lies the redemption of the veld.

Revue de l'Afrique du Sud.—Official Publication. Cape Town.

As in Victoria or Canada stock-keeping is the principal occupation. Ostrich-farming is also important.

Ostrich-Farming

There are not many animals prettier than a little ostrich chick during the first few weeks of life. Instead of feathers it has a little rough coat which seems all made up of narrow strips of material, of as many different shades of brown and grey as there are in a tailor's pattern-book, mixed with shreds of black; while the head and neck are apparently covered with the softest plush, striped and coloured just like a tiger's head on a small scale. They grow quickly, and with their growth they soon lose all their prettiness and roundness; their bodies become angular and ill-proportioned, a crop of coarse, wiry feathers sprouts from the parti-coloured stripes which formed their baby-clothes, and they enter on an ugly hobbledehoy stage in which they remain for two or three months. A young ostrich's rough, bristly, untidy-looking chicken feathers are plucked for the first time when he is nine months old; they are stiff and narrow with very pointed tips, and their ugly appearance gives no promise of future beauty. Not until their wearer is plucked for the third time have they attained their full width and softness.

At five years the bird has attained maturity; the plumage of the male is then of a beautiful glossy black, and that of the female of a soft grey, both having white wings and tails. In each wing there are twenty-four long white feathers, which, when the wing is spread out, hang gracefully round the bird like a lovely deep fringe. The ostrich's body is literally a bag of bones, and the enormously developed thighs, which are the only fleshy part of the bird, are quite bare, their coarse skin being of a



peculiarly ugly blue-grey colour. The little flat head, much too small for the huge body, is also bald, with the exception of a few stiff bristles, and scanty tufts of down, such as also redeem the neck from absolute bareness.

On a large farm, when plucking is contemplated, it is anything but an easy matter to collect the birds. Men have to be sent out in all directions to drive the birds up by twos and threes, from the far-off spots to which they have wandered. Little troops are gradually brought together and collected first in a large enclosure, then in a small one, the plucking-kraal. Besides the gate through which the ostriches are driven into the kraal, there is an outlet at the opposite end, through the plucking-box. It is a very solid wooden box, in which, though there is just room for an ostrich to stand, he cannot possibly turn round. At each end there is a stout door, one opening inside, the other outside the kraal. Each bird in succession is dragged up to the first door and, after more or less of a scuffle, is pushed in and the door slammed behind him. Then the two operators, standing on each side of the box, have him completely in their power. With a few rapid snips of the shears his splendid wings are soon denuded of their long white plumes. The tails, and the glossy black feathers on the bodies of the birds, having small quills, are not cut, but pulled out.

MRS. MARTIN.—*Home Life on an Ostrich Farm.* George Philip.

By permission of Messrs. Philip and Son.

Kimberley, on the plateau, at no great distance from the Vaal-Orange confluence, has famous diamond mines.

The Kimberley Diamond Mines

The De Beers and the Kimberley mines are probably the two biggest holes which greedy man has ever dug into the earth, the area of the former at the surface being 13 acres, with a depth of 450 feet, the area and depth of the latter being even greater. The mines are no longer worked from the surface, but from shafts sunk at some

distance from the original holes, and penetrating to the blue ground by transverse drivings at depths varying from 500 to 1200 feet. The blue ground, when extracted, is carried in small iron trucks to the "floors." These are made by removing the bush and grass from a fairly level piece of ground; the land is then rolled and made as hard and smooth as possible. These "floors" are about 600 acres in extent. They are covered to the depth of about a foot with the blue ground, which for a time remains on them without much manipulation. The heat of the sun and moisture soon have a wonderful effect upon it. Large pieces which were as hard as ordinary sandstone when taken from the mine soon commence to crumble. At this stage of the work the winning of the diamonds assumes more the nature of farming than of mining; the ground is continually harrowed to assist pulverisation by exposing the larger pieces to the action of the sun and rain. The blue ground from Kimberley mine becomes quite well pulverised in three months, while that from De Beers requires double that time. The longer the ground remains exposed, the better it is for washing. The process of exposure being completed, the blue ground is carried to very elaborate and costly washing machines, in which, by means of the action of running water, the diamonds are separated from the ordinary earth. In this process 100 loads of blue ground are concentrated into one load of diamondiferous stuff. Another machine, the "pulsator," separates this latter stuff, which appears to be a mass of blue and dark pebbles of all shapes, into four different sizes, which then pass on to the assorters. The assorting is done on tables, first while wet by white men, and then dry by natives. The assorters work with a kind of trowel, and their accuracy in detecting and separating the diamond from the eight different kinds of mineral formations which reach them is almost unerring.

LORD RANDOLPH CHURCHILL.—*Men, Mines, and Minerals in South Africa.* Low.

By permission of Messrs. Sampson Low and Co.

North-east of Cape Colony is Natal, in the latitude of Northern New South Wales and Southern Queensland, which it resembles. Palms, bananas, and sugar flourish in the coastal belt, and stock-raising is important on the veld.

Natal

Starting from the coast, the Colony, by a series of almost regular steppes, attains an altitude of about $2\frac{1}{4}$ miles above sea-level at the Drakensberg, where snow-clad peaks are no uncommon sight.

The most prominent points in the Drakensberg range are Champagne Castle or Cathkin Peak, 12,000 feet above sea-level. The next point is Giant's Castle, 11,000 feet; Mont aux Sources, also 11,000 feet. Tintwa comes next with 7500 feet of altitude, while Amajuba, of tragic memory, ranks last with an altitude of 7000 feet.

The Tugela, in the north of the Colony, is the longest and most beautiful river. Taking its source in the Drakensberg it leaps with one bound over a cliff 1800 feet sheer into the Colony. The horse-shoe curve, from which the Tugela springs, is composed of serried mountains. Dark fissures seam the declivities, weird-looking trees cut against the soft-toned distance, the air is filled with the mystery, the loneliness, and the beauty of Africa. Leaving the pool at the base of the yet to be world-famed precipice, the river sets out on its 200 mile journey through forest and mountain, krantz and glade. The whole course is one huge panorama of beauty and wealth; for the most part, the latter is only in its initial stage of development. This great valley, which traverses the Colony from end to end, may yet be the centre of more than one important industry, such as gold, copper, coal, and asbestos mining, while its fertile alluvial banks produce phenomenal crops of maize, Kafir corn, and many other cereals.

J. FORSYTH INGRAM.—*The Colony of Natal.*

By permission of the Agent-General for Natal.

View of Natal from Van Reenan's Pass

Let us pause while at the top of the Drakensberg, 10 or 12 miles before reaching Harrismith, and look back. We are in Van Reenan's Pass, 7000 feet above the sea, and immediately beneath the fine cone of Rensberg's Kop, one of the few conical mountains of South Africa, where they are nearly all flat-topped. In front of us is spread out the whole of fair Natal, "the Garden of South Africa," tumbling away in a marvellous jumble of startingly green rolling hills, dark bush-clothed valleys, and vast park-like expanses, all streaked and scored with lines of gleaming water. To the right frown the forbidding cliffs and precipices of Giant's and Champagne Castles, 11,000 feet in altitude, and on the left, 150 miles away, but clear-cut as if within reach, another conical mountain, under which nestles the Transvaal village of Wakkerstroom. If it be a spring day, and the usual thunderstorm has passed over, the great masses of cumuli rolled away to the south, the sea-line, 190 miles away, may be distinctly seen, and there be they who say they have seen the lighthouse on the Durban Bluff. It is a fine picture, partaking alike of the grand and the beautiful, the soft and the severe, and so clear and crisp is the atmosphere that little white dots of farm-houses, brown Kafir huts, and moving trains of waggons along the red roads, may be made out at distances so great that one hesitates to print them.

G. LACY.—*Pictures of Travel, Sport, and Adventure*. C. A. Pearson.

By permission of George Lacy, Esq., and of Messrs. C. Arthur Pearson, Ltd.

Between Natal and Orange River Colony is the mountainous Basutoland.

Basutoland

Basutoland has been frequently called the Switzerland of South Africa. Occupying, as it does, the very loftiest

valleys in this part of the continent, and placed in the most favourable position for intercepting the south-easterly summer breeze, it is not surprising to find that, as in the case of Switzerland in Europe, Basutoland is the head and centre from which most of the large rivers flow. From the Tugela to the Orange, from the Vaal to the St. John's, all are replenished from its bountiful and perennial springs.

The climate itself is keen and invigorating during the winter, but cold. During the summer it is subject to heavy rains, but the intervals are bright and clear.

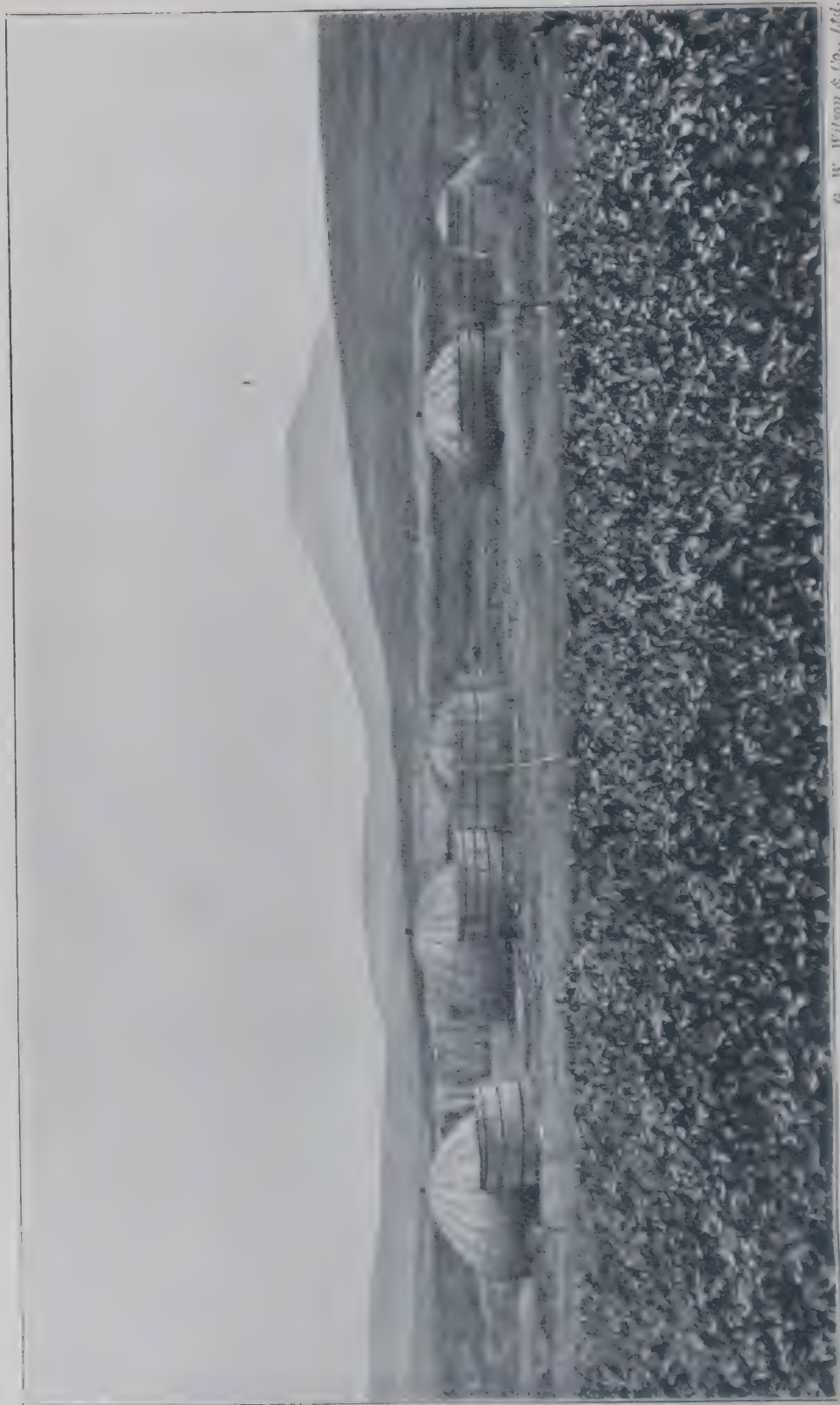
A. S. AND G. G. BROWN.—*Union-Castle Line's Guide to South Africa*. Low.

By permission of Messrs. Donald Currie and Co.

Orange River Colony and the higher parts of the Transvaal are veld lands. Before the discovery of gold in the Witwatersrand, or Rand, stock-raising was the only occupation. The important gold-mining industry centres at Johannesburg. Diamonds are also found.

Climate and Resources of the Transvaal and Orange River Colony

Rain is most prevalent from October to April, when the winds from the south-east retain some of their moisture till they reach the plateau. In the east the annual rainfall is about 40 inches, at Johannesburg only 30, while it falls to only 12 on the western border. The rain is on the whole very uncertain, great drought prevailing at times, while at others the rivers are swollen and cause large and destructive floods. The climate, owing to the altitude of the country and the dry winds from the Kalahari Desert, is exceedingly healthy, with the exception of a few low-lying tracts on the Limpopo, Olifants, and other rivers of the eastern borderlands. The hot winds from the desert cause the average temperature to be rather high in spite of the elevation, the annual mean being 68° to 70° F.



NATIVE KRAAL AND MEALIE-FIELD BELOW MAJUBA

Most of the Orange River Colony is well adapted for grazing purposes, and the rearing of stock and ostriches is the principal occupation of the people. Wheat-growing is, however, rapidly extending, particularly in the south-eastern part of the territory, where the soil is exceptionally fertile. The detritus washed down from the sandstones and limestones of the adjacent hills enriches the valleys. The crops are yearly increasing, and this country may, when transport is made less costly by the construction of railways, supply South Africa with cereals. Fruits also thrive, as well as trees, oak, pine, and fir.

The Hooge Veld, 4000 to 7000 feet high, occupies much of the south and east of the Transvaal, and is well suited for sheep. The Bosch Veld on the north—grassy country interspersed with low hills and trees—is adapted for cattle and corn, while in the extreme north, coffee, sugar, and tropical produce would find a suitable climate. Tobacco of good quality is exported. The chief wealth of the Transvaal, however, consists in its mines. The Yzerberg, near Marabasstad, is a mass of rich iron ore. Coal is found in Utrecht and Wakkerstroom, in Middelburg and Lydenburg, and copper, tin, lead, quicksilver, etc., are distributed all over the country. But the most important mineral is gold. The best-known mines are the De Kaap and the Witwatersrand, though the mineral is also extracted in the Lydenburg and Zoutpansberg districts and elsewhere. The Witwatersrand consists of strata of sandstone, quartzite, slate, and conglomerate tilted at a considerable angle. The gold is found in conglomerate veins, which are called “banket” reefs, from their resemblance to the sweetmeat called almond rock. The mines of the Orange River Colony are less important. Diamonds are found at Jagersfontein and Koffyfontein, and one or two other spots. Coal, magnetic iron, salt-petre, and salt are also worked.

ANON.—*Scottish Geographical Magazine*, November 1899.

By permission of the Royal Scottish Geographical Society.

The Witwatersrand Gold-Field

Since the discovery of gold in the Transvaal, gold-mining has become by far the most important industry of the country. Before gold was found, industry was limited to agriculture and stock-raising, and commerce was represented only by the trade and barter which the up-country storekeepers carried on with the farmers.

Gold was known to exist in the Transvaal as long ago as 1845, but the first gold-field of real importance was that opened in the Lydenburg district in 1872-73. The Barberton fields were declared public diggings in 1884, and in 1886 the Witwatersrand district was proclaimed a public gold-field, owing to the great richness of the conglomerate beds near the centre of the Witwatersrand. Attention was soon concentrated on that area, and several of the mines were established, whose fame has since spread all over the world. The Robinson, the Peireira, the Crown Reef, and others, speedily showed that this was a field which bid fair to take a leading place among the world's gold-fields. Yet there were then few who imagined that the Rand would in fifteen years eclipse all rivals, and even now they are few who realise its immense and astounding capabilities. The amount of coined gold in the world is estimated to have doubled itself in the 30 years between 1860 and 1890, and to have been at the end of that period about £736,000,000. The amount of gold within the range of practical mining in the Witwatersrand district of the Transvaal is probably four times that amount.

W. BLELOCH.—*New South Africa*. Heinemann.

By permission of Mr. W. Heinemann.

Johannesburg

Johannesburg extends for a considerable distance along a ridge of hills 6000 feet above the level of the sea.

Around wherever the eye reposes it is arrested by mining-shafts, hauling-gear, engine-houses, and tall chimneys. Johannesburg presents a very English appearance—that of an English manufacturing town, minus its noise, smoke, and dirt. The streets are crowded with a busy, bustling, active, keen, intelligent-looking throng. Here are gathered together human beings from every quarter of the globe, the English possessing an immense preponderance. The buildings and general architecture of the town attain an excellent standard, style having been consulted and sought after, stone and bricks the materials, corrugated iron being confined to the roofs; solidity, permanence, and progress the general characteristics.

LORD RANDOLPH CHURCHILL.—*Men, Mines, and Animals in South Africa.* Low.

By permission of Messrs. Sampson Low and Co.

North of Cape Colony and the Transvaal are the Bechuanaland and Rhodesian Protectorates, both in process of settlement.

Bechuanaland is extremely dry, passing in the west into the Kalahari Desert.

Bechuanaland

North Bechuanaland is in many parts well-wooded and beautiful, its hills covered with vegetation to their summits. This is a country which is capable of sustaining a large population, when the appliances of civilisation have been introduced; but it is at present very sparsely inhabited.

South Bechuanaland is an open, grassy country, having much in common with the Transvaal, the Free State, and the eastern part of the Cape Colony, and is far superior to the north-western province of the Cape Colony from the Karroo northward.

The acacia trees, which are found at the foot of the hills and other sheltered parts of the country, would

have been more abundant but for the cold in severe winters. The districts near Kimberley have been well-nigh denuded of trees in order to supply fuel for the engines at work in the diamond mines.

This destructive work has been rendered less necessary since the opening of the railway to Kimberley, as coal now competes with firewood. The wild olive, the karee, and the wilgerhout are found in the plains and by the river banks of South Bechuanaland, while the mahatla and the moretlwa bushes give variety to the landscape, and afford grateful shelter to the stock in the cold weather. The Bechuanaland landscape during the dry winter months bears a solemn grey aspect, from the colour of the ripened prairie grass, but a few days after the first rainfall a glorious change takes place, as if by magic. Grey gives place to green, and nature with lavish hand scatters everywhere brilliant flowers, to beautify a scene which in most cases is almost tenantless by man. During the summer months the rainfall is great. The old saying is strictly true there: "It never rains but it pours." I must add, however, that it frequently threatens to rain without doing it. You see the storm in the distance—you hear the growling of the thunder. On it comes, a blinding storm of dust, warranted not only to enter your nicely-dusted parlours, but your own eyes and mouth, and ears and nostrils. The thunder is now at its loudest, the lightning literally blinds and dazzles you; and sometimes all this is only "threatening," and there is no rain. After such a paroxysm, the copious tears of nature are welcome indeed. If it does not rain every one is disappointed. We speak of "a fine rain" out there, while in this country you say, with an heroic effort at resignation, "Another rainy day." What has to be done in Bechuanaland and in South Africa is to conserve the rain which falls, and which makes haste to escape to the ocean.

J. MACKENZIE.—*Scottish Geographical Magazine*, June 1887.

By permission of the Royal Scottish Geographical Society

As in the desert regions of Australia certain plants in the Kalahari possess water-storing properties.

Succulent Plants of the Kalahari Desert

The water-root, which has doubtless saved many from dying of thirst, is met with throughout the most parched plains of the Karroo. It is a large oval bulb, varying from 6 to 10 inches in diameter, and is of an extremely juicy consistence, with rather an insipid flavour. It is protected by a thin brown skin, which is easily removed with the back of a knife. It has small, insignificant narrow leaves, with little black dots in them, which are not easily detected by an inexperienced eye. The ground round it is generally so baked with the sun that it has to be dug out with a knife. The top of the bulb is discovered about 8 or 9 inches from the surface of the ground, and the earth all round it must then be carefully removed. Throughout the whole of the great Kalahari Desert, and the vast tracts of country adjoining thereto, an immense variety of bulbs and roots of this juicy description succeed one another monthly, there being hardly a season of the year at which the poor Bakalahari, provided with a sharp-pointed stick hardened in the fire, cannot obtain a meal, being intimately acquainted with each and all the herbs and roots which a bountiful hand has provided for his sustenance. There are also several succulent plants, having thick juicy leaves, which in like manner answer the purpose of food and drink. Above all, a species of water-melon bitter is thickly scattered over the entire surface of the known parts of the great Kalahari Desert. These often supply the place of food and water to the wild inhabitants of these remote regions. Most of these roots are much eaten by gemsboks, which are led by instinct to root them out. The elephants also, apprised by their acute sense of smell of their position, feed upon them, and

whole tracts may be seen ploughed up by the tusks of these sagacious animals in quest of them.

R. GORDON CUMMING.—*Five Years of a Hunter's Life in the Far Interior of South Africa.*

Rhodesia may be compared with tropical Queensland. It is a veld land, with densely forested tropical valleys opening to the Limpopo and Zambezi.

Rhodesia

The conditions of a country like Rhodesia, which is larger than France and Germany put together, and which includes the low-lying valleys of the Zambezi and the Limpopo, as well as the high open downs of Matabililand and Mashunaland, must be very diverse. Only those portions of the country are suitable to North Europeans where the altitude above sea-level renders the climate temperate. For in tropical Africa malarial fever is the white man's most deadly enemy; and as this most insidious disease is everywhere prevalent in Rhodesia, where the altitude is less than 4000 feet above sea-level, it is only the elevated back-bone of the country which is likely to be peopled by white men; whilst in Eastern Mashunaland, where the country is extremely well watered, many people suffer much from fever—though of a much milder type than in the hot tropical lands in the basins of the great rivers—even up to an altitude of 5000 feet.

Once beyond the range of fever, however, the climate of this part of Africa is probably one of the finest in the whole world. Even in the hottest weather the heat is not excessive, for the thermometer seldom registers a temperature of over 90° in the shade on the high plateaus of Eastern Mashunaland—and 90° in the shade is not very trying to an altitude of 5000 feet—whilst the nights are always cool and bracing the whole year round. During the winter months, namely, May, June, and July,

the nights are cold and frosty, and the days bright and clear—pleasantly warm, but not too hot. During the months of November, December, January, February, and March heavy rains may be expected, with thunderstorms during October and April, and sometimes a little light rain during the winter months. The rainfall is, however, very unevenly distributed after the five months I have mentioned, as in some years continuous rains set in early in November, whilst in others little or none falls till late in December. As a rule the heaviest rains take place after Christmas. The average annual rainfall would be probably over 40 inches, though of late years it has been frequently below that figure. Droughts or inadequate rains have been prevalent all over South Africa since 1891. In the rainy season, which ended in April of that year, however, a rainfall of 53 inches was recorded in Salisbury, Mashunaland.

F. C. SELOUS. — *Scottish Geographical Magazine*, October 1897.

By permission of the Royal Scottish Geographical Society.

Resources of Rhodesia

In many places, especially on the high plateaus north of Umtali and in Matabililand, the conditions for successful farming are assured. The soil is fertile, vegetables of all sorts, including the ordinary English fruits, growing luxuriantly. I have seen splendid potatoes and crops of wheat and oats. Cattle thrive well and are always fat. Wherever the farms are near a market large profits are made. In Gazaland, a healthy district south of Umtali, some 300 or 400 families, principally Afrikander, have settled and devoted their attention to farming. They have grown their own wheat and tobacco, tanned their own leather, used honey for sugar, and the juice of the india rubber tree for candles. In a few years Rhodesia should be able to rear all its own horses and cattle. The one thing necessary to make agriculture profitable

is a market, and that depends upon population; and whether the country becomes densely populated or not, depends upon the extent and richness of the gold mines there. A large number of very rich reefs have been discovered, and their richness proved to a very considerable depth and length.

G. S. FORT.—*Scottish Geographical Magazine*, June 1896.

By permission of the Royal Scottish Geographical Society.

See also "Rhodesia," *Scottish Geographical Magazine*, February 1900, and MR. SELOUS's article already quoted.

We are now approaching the Zambezi, which the line from Cape Town crosses just below the famous Victoria Falls.

Victoria Falls

To one looking over the edge of the falls, the great river seems suddenly to come to an end, no continuation of its channel being visible. The Zambezi for its whole mile of breadth thunders down precipitously into a comparatively narrow, profound trench, or cañon, which extends at right angles to the river's course from shore to shore. Beyond the Falls one is faced by the perpendicular wall of the cañon. Below, the madly whirling spray obscures the view of the bottom of the cañon, and it seems as if the whole mighty flood were falling into the centre of the earth through this awful chasm. But the river has its exit, a precipitous cleft, only a hundred yards in breadth, near the eastern end of the cañon, through which the whole of the contracted Zambezi rushes with incredible speed, fury, and confusion, forming at this point what is called the Boiling Pot. Through this gorge the Zambezi, in places narrowed to 50 yards, of unknown depth, and 400 feet below the level of the flat it traverses, rages onward for 45 miles between towering cliffs. This wonderful gorge takes a series of very sharp bends, turning round on itself continually and flowing in contrary directions.



VICTORIA FALLS
KINGSTON

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VICTORIA FALLS.

We came to a point at the eastern end of the cañon which commands one of the grandest views of the cataract, an opening in the bush just below the Falls, where I was able to stand at the extreme edge of the cliff. On my right, close to, was the eastern end of the mile-long cataract. Over the lip of the cascade the river first rushed in a smooth convex curve, then dropped sheer, and a little way down the wall of water seemed to fall to pieces. In places it looked like an avalanche of snow and solid water and whirling vapour intermingled. Though I could look far down into the chasm I could not see where the water fell to, for the depths below were obscured by the seething spray, that assumed wondrous forms, now curling in broad white whirlpools, and now rising high in fast-spinning columns like dry snow when it is carried up by the whirlwind. But occasionally a gulf would suddenly open out in the spray mass, as suddenly to close in again, through which I caught a momentary glimpse of the tumult of water at the bottom of the cañon 400 feet beneath me.

On my left hand, rising from the whirling foam, was the great black perpendicular cliff that, bordering the chasm, faces the cataract along its whole length crowned with a luxuriant vegetation, richly coloured, in striking contrast to the blackness of the rock and the whiteness of the water and the spray. The black cliff itself was scored with innumerable tiny silvery cataracts, formed by the spray drops, which, falling from the leaves of the forest, flow in little streams to the precipice brink to throw themselves over and return whence they came. Such was the picture before me as I looked up the cañon under the bridging rainbow. I could not see far down that lane of raging waters. I could only distinguish distinctly the portion of the cataract that was near to me—a hundred yards or so out of that mile long line of falling water; and so, too, on the other side, my eyes could only follow the black cliff for a short distance. Both cataract and rock and cliff gradually faded out of

sight in the glorious spray mist that rose from the cañon, and, with the sun shining through it, gleamed like a luminous pearl that filled all the background of the scene.

E. F. KNIGHT. — *South Africa after the War.* Longmans.

By permission of Messrs. Longmans.

The tropical forests of the Zambezi are as dense as those of North Queensland, in similar latitudes. Through these, varied by grass lands, the river makes its way to the sea.

The British lands north of the Zambezi will be described with Tropical Africa.

THE EGYPTIAN SUDAN AND EGYPT

South Africa stretches from temperate to tropical latitudes. Much of it is too dry for farming or stock-keeping, and the question of irrigation is a vital one for the development of the interior. In both these respects it may be compared with Egypt and the Egyptian Sudan in the north of the continent. The Egyptian Sudan corresponds with Rhodesia. Egypt, a narrow strip of desert made fertile by the Nile, is drier than any part of the veld or the Kalahari Desert.

Egypt is nominally a Turkish possession, ruled by a khedive, but it is practically controlled by Britain; while the Anglo-Egyptian Sudan is under the joint administration of Britain and Egypt.

The Nile rises south of the equator in streams which flow to Lake Victoria. This lake will be described with the Central African colonies.

The Nile at Lake Victoria..

Accession No;
The Nile, where it issues from the Victoria Lake, is a deep, broad stream from 500 to 800 yards across, with a strong current towards the Ripon Falls. The scenery is very beautiful, for the banks are high and densely wooded,
Date;

and small islands dot the bay (Napoleon Gulf), or stand out to sea in the blue distance. Large schools of hippo snort and grunt in the water, and the old familiar cry of the kwazi (fish-eagle) recalls unforgotten scenes on the Nyasa Lake, while the vast expanse of water to the far horizon reminds us of the ocean.

SIR F. J. D. LUGARD. — *Our East African Empire.* W. Blackwood.

By permission of Messrs. W. Blackwood and Sons.

The Nile descends rapidly to Lake Albert, to which the waters of Lake Albert Edward are brought by the Semliki, which flows through forest scenery like that of the Zambezi.

Lake Albert Edward

The Albert Edward Lake, which lay spread out at our feet, was very beautiful. No reeds or marsh-growth here broke the outline of its shores; and wooded islands in the foreground studded the expanse of water, which stretched onwards till it met the horizon in the far and hazy distance. Beyond rose the lesser mountains—giant peaks themselves—which formed the bulwarks of the snow-clad summits of Ruwenzori.

SIR F. LUGARD — *Our East African Empire.* W. Blackwood.

By permission of Messrs. W. Blackwood and Sons.

The Semliki Valley and Ruwenzori

The part of the Semliki Valley which extends from Lake Albert south-westerly is very level; for 30 miles it only attains to an altitude of 50 feet above the lake. In one of its crooked bends nearer the south-eastern range we stumbled suddenly upon the Semliki River, with an impetuous volume, from 80 to 100 yards wide, and an average depth of 9 feet.

Beyond the grassy portion of the valley, a few acacias begin to stud it, which as we proceed south westerly

become detached groves, and then a continuous thin forest until we reach the dense and rank tropical forest, with tall trees joined together by giant creepers, and nourishing in its shade thick undergrowth. Everything now begins to be sloppy, wet leaves and branches glisten with dew, weeping mosses cover stem, branch, and twig. The ground is soaked with moisture; a constant mist rises from the fermenting bosom of the forest. In the morning it covers the valley from end to end, and during the early hours stratum after stratum rises, and, attracted by the greater draught along the slant of the Ruwenzori slopes, drifts upwards, until the summits of the highest mountains are reached, when it is gradually intensified until the white mist has become a storm-cloud and discharges its burden of moisture amid bursts of thunder and copious showers.

The valley rises sensibly faster in the forest region than in the grassy part. Knolls and little rounded hills crop out, and the ground is much more uneven. Violent streams have ploughed deep ravines, and have left long narrow ridges scarcely a stride across at the summit, between two ravines a couple of hundred feet deep. At about 75 miles from the Albert Nyanza the valley has attained about 900 feet of altitude above it, and at this junction the forest region abruptly ends. From this place the valley becomes like a level grassy plain until the Albert Edward Nyanza is reached.

SIR H. M. STANLEY.—*Scottish Geographical Magazine*, January 1890

By permission of Sir H. M. Stanley and of the Royal Scottish Geographical Society.

“We had a magnificent view of Ruwenzori just before sunset one evening. A large field of snow and snow-peaks appeared in view. During the whole day our eyes had rested on a long line of dark and solemn spurs loomed up one after another, and a great line of mountain shoulders stood out; then peak after peak struggled from behind night-black clouds into sight, until at last the snowy range, immense and beautiful, a perfect picture of beautiful and majestic desolation, drew all eyes.”—SIR H. M. STANLEY.—*In Darkest Africa*. Low.

Lake Albert

Lake Albert reminded me much of the Nyasa. Like it in shape, the opposite shores were clearly visible across the blue waters, though to the north the lake appeared limitless. Along the eastern coast of Nyasa runs a range of blue mountains, while the western shores slope gently to the lake. So it is also with the Albert, for the high plateau of Unyoro (over 5300 feet above the sea) ceases suddenly, and precipitous cliffs descend to the trough of the lake (2170 ft.), which look, across the water, like a range of lofty mountains. Sitting on the white sands, with the waves rolling lazily to my feet, I could imagine myself back on the shores of Nyasa.

The Sudanese villages on the lake shore grew nothing but cotton, which the women were collecting all day in the fields, and which they sent to headquarters in exchange for food. Such few natives as we met were of a low type. They eked out a living by fishing, and by washing in earthen troughs the saline deposits around their villages. The water thus impregnated with salt was allowed to evaporate, and the crystal deposit was then collected and exchanged for food.

SIR F. LUGARD.—*Our East African Empire*. Blackwood.

By permission of Messrs. W. Blackwood and Sons.

Below Lake Albert the Nile still descends and enters the Egyptian Sudan.

A Glimpse of the Egyptian Sudan

The whole district of Sennar, on account of its position between the Blue and White Niles, and the districts on the East of the Blue Nile, are capable of great development. The fertility of these provinces depends wholly on the amount of the rains, which begin in May and continue till the beginning of September. None of the



SCENERY ROUND PHILE.

rivers overflow their beds, which are deeply cut in the alluvial soil, and contribute their contents towards the formation of the Nile delta. The whole of Kassala, together with the district between the Blue Nile, the Atbara, and the White Nile, as also Sennar, might easily be converted into a large cotton plantation. A rainfall from May to September ensures the growth of the plants, and a perfectly dry harvest time ensures the cotton being gathered in the best possible condition. It would also be possible to grow corn here to any extent.

The province of Kordofan may be said to be one vast plain, sloping from south to north. At the highest part, that is, at its southern extremity, it is 2000 feet above sea-level. There are no mountain ranges, and but few hills, and these are not more than 400 feet above the level of the surrounding country. No rivers or streams are to be found; but there are some shallow *khors*, which contain a little water during the rains. Here and there one comes across a well, but water is very scarce, and has to be procured from a considerable depth. In some parts of Kordofan there are deserts, through which the traveller may wander for days without seeing a sign of vegetation. Everywhere the scenery, excepting during the harif,¹ is dreary and desolate in the extreme. For a few weeks then the landscape is pretty, the plains being covered with grass, and the trees bright with fresh green. But the beauty soon vanishes, and from October to June the country becomes a parched desert.

The whole of the Bahr-el-Ghazal district is splendidly watered. Numberless rivers rising in the south pour an immense volume of water into the Bahr-el-Ghazal, and between the streams forests of mighty trees or fertile undulating plains abound. Here tropical luxuriance is seen to perfection; the winding forest paths lead through charming sylvan scenery. One is completely surrounded by trees, whose mighty branches interlace so thickly that it is impossible to see their crowns, which in many instances

¹ The rainy season.

tower to a height of more than 100 feet. The dense foliage completely shuts out the sun, and even at midday one marches along in a dim mysterious twilight. Bright-coloured creepers droop in graceful festoons from the trees, forming bowers of ever-varying beauty. Now and then birds of lovely plumage fly overhead, startling one by their shrill cries; rainbow-hued butterflies flutter hither and thither, while the hum of myriads of insects makes the silence more intense. The atmosphere, heavy with the overpowering scent of tropical vegetation, produces a feeling of oppression, and though rejoicing at the marvellous beauty so lavishly displayed, one is glad when a break in the forest permits one to breathe a purer, cooler air.

DR. R. W. FELKIN.—*Scottish Geographical Magazine*, June 1885.

By permission of Dr. R. W. Felkin and of the Royal Scottish Geographical Society.

“The sluggish current of the Bahr-el-Jebel,¹ Bahr-el-Zeraf,² Bahr-el-Ghazal, and the lower course of the affluents, the marshes and numerous creeks, favour the formation of *sudds*. In the lagoons and backwaters aquatic plants grow with great luxuriance, and becoming detached from the soil during floods are carried into the rivers, where the sluggish current allows them to collect into dense masses. So compact are these floating islands that natives sometimes take up their abode upon them, supporting themselves with fishing, and hippopotamus and crocodiles getting entangled among them die of starvation.”—ANON.—*Scottish Geographical Magazine*, February 1899.

At Khartum the sluggish stream of the main stream or White Nile unites with the swift Blue Nile from Abyssinia, whose waters, with those of a second Abyssinian tributary, the Atbara, cause the annual floods of the Nile. The sediment with which both are loaded supplies the fertilising mud which is left behind as the flood waters subside.

The Nile at Khartum

Eight kilometres up-stream of Omdurman the Blue and White Niles unite, forming the low tongue of land on

¹ Name of the Nile above Lake No.

² A loop of the White Nile.



A NILE-BOAT.

which Khartum was built. Just below the junction is the well-cultivated island of Tuti. The Blue Nile surrounds this last on two sides, one channel going to the east and the other running along the southern shore of the island towards the White Nile. At this point the difference in colour of the two rivers is very marked, the azure blue of the Blue Nile forming a vivid contrast to the yellowish-brown water of the White Nile. The line separating the two currents is visible for a long way down the stream. In flood, the velocity of the Blue Nile being much the greater, the water of this river pushes that of the White Nile across to the Omdurman shore. On the northern face of the tongue of land mentioned, the town of Khartum is built. The frontage on the Blue Nile is unrivalled as regards aspect, and obtains the full benefit of the prevailing north wind. Behind this, however, more especially in the direction of the White Nile, there are portions of the town which lie very low.

SIR W. GARSTIN.—*Report on the Sudan, 1899.*

“The two rivers which unite at Khartum are absolutely unlike in character. The Blue Nile descends rapidly from the Abyssinian plateau, in a deep and narrow channel, carrying with it an abundance of fertilising matter gathered from the mountains and forests which form its watershed. Sometimes it flows in a shallow stream, at other times its banks can scarcely contain the volume of water which it pours impetuously between them. The White Nile, on the other hand, flows with a broad and sluggish stream between low banks, and the volume of its waters varies but slightly, since it is fed by the constant supplies afforded by the Great Lakes of Central Africa. The country which surrounds the Blue Nile and its affluents affords the richest prospects in the Sudan. The region through which the White Nile passes is a succession of desolate and fever-stricken swamps, behind which low and treeless plains flow in endless monotony.”—BASIL WORSFOLD.—*Redemption of Egypt.* G. Allen.

Between Khartum and Aswan there are several hundred miles of broken water and rapids, forming the six Cataracts of the Nile. In this distance the Nile falls nearly 1000 feet. Between the Sixth and Fifth Cataracts the Nile receives the Atbara, a raging torrent after the

summer rains, but a mere string of pools in the dry season.

The Atbara in Flood

The Atbara was nowhere less than 400 yards in width, while in many places this breadth was much exceeded. The banks were from 25 to 30 feet deep. These had evidently been overflowed during floods, but at the present time the river was dead. Not only partially dry, but so glaring was the sandy bed that the reflection of the sun was almost unbearable. The only shade was afforded by the evergreen dome-palms. Wherever a pool of water in some deep bend of the dried river-bed offered an attraction, were Arab villages or camps, of the usual mat tents formed of the dome-palm leaves.

Many pools were of considerable size and of great depth. In flood-time a tremendous torrent sweeps down the course of the Atbara, and the sudden bends of the river are hollowed out by the force of the stream to a depth of 20 or 30 feet below the level of the bed. Accordingly these holes become reservoirs of water when the river is otherwise exhausted. In such asylums all the usual inhabitants of this large river are crowded together in a comparatively narrow space. Although these pools vary in size, from only a few hundred yards to a mile in length, they are positively full of life: huge fish, crocodiles of immense size, turtles, and occasionally hippopotami, consort together in close and unwished-for proximity. The animals of the desert—gazelles, hyenas, and wild asses—are compelled to resort to these crowded drinking-places, occupied by the flocks of the Arabs equally with the timid beasts of the chase.

The cool night arrived, and about half-past eight I was lying half-asleep on my bed by the margin of the river, when I fancied that I heard a rumbling like distant thunder. A low uninterrupted roll appeared to increase in volume though far distant. Hardly had I raised my head to listen more attentively when a confusion of voices

arose from the Arabs' camp, with a sound of many feet, and in a few minutes they rushed into my camp shouting to my men in the darkness, "El Bahr. El Bahr" (The river. The river).

On the morning of the 24th June I stood on the banks of the noble Atbara River, at the break of day. The wonder of the desert—yesterday there was a barren sheet of glaring sand, with a fringe of withered bush and trees upon its borders, that cut the yellow expanse of desert. For days we had journeyed along the exhausted bed. No bush could boast a leaf; no tree could throw a shade; crisp gums crackled upon the stems of the mimosa, the sap dried upon the burst bark. In one night an army of water was hastening to the wasted river. There was no drop of rain, no thunder-cloud on the horizon, all had been dry and sultry. Dust and desolation yesterday, to-day a magnificent stream, some 500 yards in width, flowed through the dreary desert.

SIR S. BAKER.—*The Nile Tributaries of Abyssinia*. Macmillan.

By permission of Messrs. Macmillan and Co., Ltd.

Aswan, at the base of the First Cataract, is the first town in Egypt which owes its fertility to irrigation by the Nile.

What Egypt Is

Egypt is a rainless desert where the earth draws its supply of water not from its own sky but from the clouds which gather 2000 miles away over the mountains of Abyssinia and Central Africa. Where the waters of the Nile can be laid upon the earth, there and there only is the face of the earth green and not brown, there only can crops be grown and trees planted, flocks and herds find pasture, and man erect his dwellings and pursue the arts of civilised life. Egypt is so much of the desert of north-east Africa as can be flooded or irrigated by the waters of the Nile. It consists first of the fields on either side

of the river from Aswan to Cairo ; second of the triangular delta at the river's mouth ; and third, of the little area called the Fayum, once lake-land, but now reclaimed and irrigated. The valley of the Nile varies in breadth from 1 to 20 miles, and consists of the plain enclosed between the low hills west and east, the Libyan and Arabian hills. It is a green riband, edging the Nile for some 500 miles from Cairo to Aswan, or 600 if we allow for the curves of the river. Together with the Fayum it constitutes Upper Egypt. A few miles south of Cairo the Nile divides into two branches. Beyond and between these two main streams numerous branches and canals form a network of channels which carry the waters of the Nile through the delta. This area, formed to a large extent of successive deposits of Nile mud, and supplied with abundance of Nile water, is called Lower Egypt. It is the chief seat of population and the source of the large supplies of cotton, the most important product of modern Egypt. Cotton is to Egypt what coal is to England or wool to Australia.

B. WORSFOLD.—*The Redemption of Egypt.* Allen.

By permission of Mr. G. Allen.

The Seasons in Egypt

Egypt being the gift of the Nile, the year is properly divisible into three well-marked seasons, corresponding with the phases of the river—summer, flood, and winter. The summer season extends from 1st April to the end of July. Water is then a most valuable commodity, the river being at its lowest. During this season, the most critical period, when the supply is inadequate, is the sixty days between the middle of May and the middle of July. The ensuing flood season begins on the 1st July and lasts till the end of November, when the river overflows its banks. The third or winter season embraces the months of December, January, February, and March.

During this period the Nile is confined within its banks, and carries a supply of water in excess of the actual requirements of agriculture.

A. SILVA WHITE.—*Expansion of Egypt*. Methuen.

By permission of A. Silva White, Esq., and Messrs. Methuen.

Irrigation and irrigation works form the life of Egypt.

Irrigation in Egypt

In parts of Upper Egypt the water is brought to the fields during the season of high Nile only. When the flood has passed away the fields thus fertilised by water and rich deposits of red mud are sown with seed, from which the crops are gathered in the early spring. Then the fields lie fallow till the season of flood returns. This natural system of irrigation—natural, because it involves no artificial interference with the river's flow—has fertilised the fields of Egypt from the time of the Pharaohs. It is still practised in Upper Egypt where lands are irrigated by the *nili* or flood canals. In Lower Egypt the artificial system, in which the *nili* canals are supplemented by *sefi* or permanent canals, was introduced early last century. Here the fields are no longer flooded for a brief period and then left fallow when the winter crops have been gathered, but they are furnished with a moderate and regular supply of water throughout the year. The Nile flood is no longer sufficient to furnish these perennial supplies. The seaward flow of the great river must be checked and a sufficient head of water maintained at all times to fill the *sefi* canals. The immediate object was to introduce the cultivation of cotton and sugar, since for these more valuable crops it is necessary that the land should be irrigated during the dry season, when the flood canals would be empty.

B. WORSFOLD.—*The Redemption of Egypt*. Allen.

By permission of Mr. G. Allen.

This was effected by constructing a barrage, a great dam, with sluices which are shut at most seasons, forming a deep head of water above the barrage, from which the canals are filled. At high Nile they are opened, carrying the flood waters to the sea. The same system is now being applied to Upper Egypt. A great dam has been built at Aswan, converting the Nubian Valley into a vast reservoir, from which the permanent canals of Upper Egypt are kept filled. The sluices are open in the flood season, and also keep the Nile below the dam full enough for the irrigation of the delta canals. A supplementary dam has been built in at Asyut.

Many primitive methods of irrigation, common to most hot countries, are seen by the traveller on the Nile.

A Glimpse of Egypt

Although there is no beauty of scenery along the line to charm the eye and take it captive, there is much that is novel and strange. You pass through a flat country, level as a lake; but the valley is green with the young corn; you see many a mud village, and many a small town with its mosque and minarets; strings of camels pass by with their long necks, and high heads, and patient looks; donkeys and carts laden with straw and Indian corn come and go; brown bare-legged men are busy amongst the millet or wheat; and veiled women and naked children are either busy in the fields or idly basking in the sun. You see for the first time the *sakich*, which is a water-mill of cogged wheels turned by an ox, and which, at each turn of the wheel, works up a series of earthen pitchers, which empty themselves into a trough, and through it send the life-giving waters through the thirsty land. Or perhaps it may be the *shaduf* that is at work. This consists of a long pole, very heavy at one end, and resting on a pivot. At the other end is placed a bucket, which is let down into the water and filled, and as the heavy end descends, the bucket pours its contents into a small trough.

From this it is worked by the foot, and flows into the channels, by which it is conveyed to the waiting fields. There is even a simpler method of raising the water intended for irrigation. Two men stand in the pool or stream, holding a bucket which is water-tight between them, and which, as they swing it to and fro, throws the water on to the bank, on which stands a third man, ready to turn it into the proper channel.

CANON BELL—*A Winter on the Nile.* Hodder and Stoughton.

By permission of Messrs. Hodder and Stoughton.

Modern Egypt

To-day from Aswan, where the Nile waters break over the shallows and rocks of the First Cataract, to Alexandria and Port Said, the iron road has been laid, and the tireless locomotive bears its freight of men and material. The traveller who visits Egypt for the first time, traversing its length from the golden shores of the Mediterranean to the borders of Nubia, is surprised to find tall chimneys breaking the level of the landscape wherever he goes. In town and country alike the West jostles the East. In the midst of the streets filled with a *mêlée* of camels, donkeys, and loosely-clad Arabs, he is startled by a section of police, marching in single file, with their sergeant at their head. The faces of these uniformed figures are dark, but their bearing unmistakably recalls the model of London. So, too, in this country the landscape is Oriental, but the tall white-brick shafts which rise above the line of palm-trees are unmistakably Western. The countenance of the desert is scored by the lines of the parallel way, and Father Nile, the parent of Egypt, wears Western trappings in the iron bridges, with their rigorous lines, which span his waters.

BASIL WORSFOLD. — *Redemption of Egypt.* G. Allen.

By permission of Mr. George Allen.



THE CITADEL, CAIRO.

View from the Citadel at Cairo

Every one who goes to Cairo visits the Citadel to see the sunset—visits it more than once; for the splendid prospect cannot be seen too often. The great city lies below you with its domes and cupolas and minarets, with its gardens and its palms and its moving throng of people; here a procession of donkeys with their riders, there a string of camels with their burdens. The Nile, winding its way through yellow sands, gleams blue in the distance, and touches in its course many a green spot which owes its beauty and fertility to its waters. Far to the west, across the opulent river, and on the edge of the arid desert, the Pyramids of Ghizeh and Dashmur rise into the sky, coloured by the rays of the sun as he hastens to his setting. Yonder, to the right, is a green plain stretching away to the land of Goshen. The Mokattam hills are rosy in the lustrous light, and the Libyan mountains form a boundary to the beautiful view.

CANON BELL.—*A Winter on the Nile.* Hodder and Stoughton.

By permission of Messrs. Hodder and Stoughton.

The control of Egypt is of enormous importance to Britain, because Egypt commands the short route to India by the Suez Canal.

The Suez Canal

The Isthmus of Suez is a narrow neck of land, about 72 miles across, connecting Africa with Asia, and separating the Mediterranean and Red Seas. It is low, sandy, desert land, without the least sign of vegetation, and entirely destitute of drinking water. There were several dried-up lakes, the bottom of some of which were 30 feet below the level of the sea, and as the water from the Red Sea was let into them by making the canal, they now form immense lakes, through which the canal passes.

Port Said has well been called the Gateway of the East. It stands on a little strip of land, which separates the Mediterranean from a lake, into which flows the Pelusian arm of the Nile. On one side of it are the cheap, temporary-looking brick and iron buildings—the half-French, half-English shops—and so much of the hurry and bustle of Western business life as can survive under that fierce Egyptain sun; on the other, the shabbiness, the squalor, and the indolent repose of the Orient.

The mixture of races to be found in the streets of the town is bewildering. Half-a-dozen strides take you past as many different nationalities—types of face and build and varieties of costume, from the half-naked Nubian in his leopard skin, with his woolly head bare to the sun, to the sallow Turk in his flowing robes—from the Arab sheik in his picturesque, if not over-clean, turban and burnouse, to Tommy Atkins in his pith helmet and brown holland regimentals. This is what might be expected at the entrance to the great highway between 400 millions of Europeans and 800 millions of Asiatics.

I. BOWES.—“The Suez Canal,” *Journal Manchester Geographical Society*, xii., 1896.

By permission of the Manchester Geographical Society.

Other important points on the route to India held by Britain are Gibraltar in the south of Spain, commanding the narrow entrance to the Mediterranean through the Strait of Gibraltar, Malta in the central Mediterranean, Cyprus in the eastern Mediterranean, and Aden in Arabia, one of the most arid spots in the world, commanding the exit from the Red Sea.

INDIA

India lies in latitudes corresponding to those of Egypt. The configuration of the two countries is very different, but in both population is concentrated on the alluvial plains of the rivers, whose waters are distributed over



SUEZ CANAL.

the widest possible areas by elaborate irrigation works. In both agriculture is the mainstay of a dense population, and the crops raised are very similar. Both early developed civilisations of a high type, marked by great skill in architecture and the decorative arts, magnificent examples of which remain in the Pyramids and temples of Egypt, and the palaces and temples of India.

India is shut in on the north by a barrier of the highest mountains in the world, including the Hindu Kush and Himalayas. The mountain states of Baluchistan in the west, Kashmir in the centre and Sikhim in the east acknowledge British supremacy.

The Himalayas rise steeply above the plains of India. Behind the dense forests of the lower ranges rise the glittering snow-peaks of the main range. The Himalayan vegetation is well seen in the ascent by rail to Darjiling in Sikhim, from which magnificent views are obtained of some of the finest peaks.

Vegetation of the Himalayas

The ascent begins quite suddenly. The Himalayas here shoot up abruptly from the Indian plains, so that at their base, though we are about 300 miles inland from Calcutta, we are scarcely more than 300 feet above the sea-level. In the next 35 miles or so of railway we rise over 7000 feet, and pass within a few hours through all the gradations of climate, from tropical to sub-Alpine. The part of the Himalayas that we are now entering is Sikhim. It may be viewed as a stupendous stairway hewn out of the western border of the Tibetan plateau by glaciers and great rivers, and leading down to the Indian plains, with a fall of about 17,000 feet in 100 miles. The face of this vast incline is roughly cut up into countless peaks and ridges, and valleys of corresponding depth, down which dash the glacial streams and thundering torrents precipitated by this rainiest section of the Himalayas. The deep gorges of the river so interpenetrate the mountains as to carry a hot climate

far along their banks, till the semi-tropic vegetation becomes almost overhung by snowy peaks.

Emerging from the sal-forest about 1000 feet above the sea, the twisting train curved in and out of shaggy ravines, carrying us through a swift succession of ever-changing scenery. The forest rapidly began to change its character. The undergrowth, which was almost a forest in itself, thinned perceptibly, and the landscape got more smiling. Higher up, we commanded bird's-eye views of the lower hills and plains. Far below we saw the rivers from the ravines we had crossed, like streaks of silver across the plain. Our train boldly skirted the top of precipitous valleys, alarmingly near the edge at times. To circumvent these precipices and the dangerous water-courses demands many an ingenious engineering device of spirals, reversing stations, and deep masonry embankments. The clearings get larger and more numerous. The less steep slopes are shorn of their forests for tea cultivation, which, with its trim, cabbage-like rows of tea bushes, does not enhance the beauty of the landscape. Now we are in a fresh temperate climate. The vegetation has completely changed, and we recognise the bramble, raspberry, strawberry, maple, chestnut, cherry, willow, sorrel, stagmoss, and many other common trees, shrubs, and weeds of temperate Europe. The undergrowth has got more open and grassy, and almost the only feature of the landscape which suggests the tropics is the feathery frond of the tall tree-ferns. Still ascending, ere we gain the elevation of 7470 feet at Ghum, the chill air has compelled us to don our thickest wraps. This village is the first outpost of the Tibetans. Here we see them shod in snow-shoes, busily flying their prayer-wheels and counting their beads. Their huts, most of which are built of kerosene oil boxes and tins, are gay with many-coloured bunting, streaming from poles topped by yaks' tails, and bearing symbolic devices to ward off devils. From tall bamboos inscribed prayer-flags fluttered in the breeze, wafting

their petitions to the countless demons who infest the air and springs and hillsides in the neighbourhood. Leaving Ghum, we glide down the grassy northern slopes of this ridge, which now shuts out the view of the Indian plains, and after about 4 miles of curving road, each bend of which reveals enchanting views, our plucky little engine lands us in the station of Darjiling.

MAJOR L. A. WADDELL.—*Among the Himalayas*. Constable.
By permission of Major L. A. Waddell and Messrs. Constable.

"The top of Senchal, a few miles south of Darjiling, is a favourite excursion. The path abounds in rare and beautiful plants, passing through forests of oak, magnolia, and rhododendron; while the summit, besides embracing this splendid view of the Snowy range over the Darjiling spur in the foreground, commands also the plains of India, with the courses of the Tista, Mahanadi, Balasan, and Mechi rivers. In the months of April and May, when the magnolias and rhododendrons are in blossom, the gorgeous vegetation is in some respects not to be surpassed by anything in the tropics. The white-flowered magnolia forms a predominant tree at 7000 to 8000 feet, and in 1848 it blossomed so profusely that the forests on the broad flanks of Senchal, and other mountains of that elevation, appeared as if sprinkled with snow. The purple-flowered kind hardly occurs below 8000 feet. During the flowering season it puts forth from the ends of its branches great rose-purple, cup-shaped flowers. In the same woods the scarlet rhododendron is very scarce, and is outvied by the great *Rhododendron argenteum*, which grows as a tree 40 feet high, with magnificent leaves, 12 to 15 inches long, deep green, wrinkled above and silvery below. I know nothing of the kind that exceeds in beauty the flowering branch, with its wide-spreading foliage and glorious mass of flowers. Oaks, laurels, maples, birch, chestnut, hydrangea, a species of fig, which is found on the very summit, are the principal features of the forest."—SIR J. HOOKER.—*Himalayan Journals*. Ward, Lock and Co.

"The view is one quite unparalleled for the scenery it embraces, commanding the grandest known landscape of snowy mountains in the Himalayas. Kangechenjunga (45 miles distant) is the most prominent object, rising out of a sea of intervening wooded hills; whilst, on a line with its snows, the eye descends below the horizon to a narrow gulf 7000 feet deep in the mountains, where the great Ranjit River, white with foam, threads a tropical forest with a silver line. To the north-west, towards Nepal, the snowy peaks of Kalru and Jannu (respectively 24,000 feet and 25,310 feet) rise over the shoulder of Singalila; whilst eastward the snowy mountains appear to form an unbroken range, trending north-east to the great mass of Dongkia (23,170 feet), and thence south-east by the fingered peaks of Tonkola and the silver cone of Chola (17,320 feet), gradually sinking into the Bhutan Mountains."—*Ibid.*

Mt. Everest, 29,000 feet, the highest mountain in the world, is not visible from Senechal, being hidden by an intervening ridge ; but it can be seen from the Tibetan side "towering up thousands of feet, a glittering pinnacle of snow, a giant among pigmies, and remarkable not only on account of its height, but for its perfect form."—CAPTAIN RAWLING.—*The Great Plateau*. Arnold.

Sir Joseph Hooker's description of the Sikhim Himalayas, though fifty years old, is still valuable for its accurate observations of scenery and vegetation. MAJOR WADDELL'S *Among the Himalayas* (Constable) is also a trustworthy book.

At the base of the Himalayas is the unhealthy region known as the Terai.

The Terai and Tea-Planting

At the base of the Himalayas lies a broad strip of land known as the Terai, a name with which we have learned to associate that wasting fever, so fatal to Europeans, and to the terrible ravages of which an enormous percentage of the natives themselves succumb. Besides a heavy rainfall, averaging something like 120 inches in the year, this strip of land is the natural drain of the Sikhim hills. The rivers running through it are continually overflowing their banks, to flood the ground for miles around, and the surplus water, being unable to get away, must be slowly absorbed by the already supersaturated earth. The dense vapour raised by the tropical sun is laden with pestilential malaria.

If the first man who had the jungle cleared to make room for the planting of tea could have foreseen the cruel loss of life his example would entail, he would surely have avoided so great a sacrifice. It was an evil hour for Terai planters when the Forest Department forbade the periodical firing of the overgrown jungle which had hitherto done something towards purifying the air of the district, and now, after years of cultivation, when every effort has been made to improve the conditions of life, the Darjiling Terai remains as unhealthy as ever.

The floor of our one-storeyed bungalow was raised

several feet above the ground, and had the usual thatched roof ; its wide verandah ran along the whole front of the house, and as we sat in comfortable long chairs, with the reed blinds down to keep out the sun, we could see the gay tropical gardens through them. It was difficult to believe so fair a spot should be so deadly from poisonous malaria.

The first tea bushes were within a stone's-throw of the house, and extended over hundreds of acres in all directions. The tea bushes presented a curious appearance to the uninitiated, being low, broad, and as flat as a table. In some parts they were quite clear, in others so crowded with weeds that one realised how great must be the labour of keeping the ground free from them. Some of the plants were of darker colour, with smaller leaves, and others of a lighter tint, with larger foliage ; the first being the China plant, and the latter, and better of the two, the Assam hybrid. The roads or paths through the tea were often execrable. Our host frequently called to us to beware of the holes, or rotten planks, in the many little bridges spanning narrow water-courses, or irrigation drains. Here and there we saw groups of coolies, women as well as men, busily plucking the four top leaves from the young shoots. They were of an unhealthy, wretched-looking type, and no wonder, when they so often had to pluck the leaves standing knee-deep in water, with a burning sun overhead.

On reaching the factory we were shown the whole process of making tea. When the coolies bring in the baskets of leaves they have plucked, it is first weighed and then put on shallow canvas trays in the withering house, where it is left all night to wither. In the morning it is put into the rolling-machine and rolled for half an hour, when it comes out a wet mass of leaf. Portions of this are then put on other trays and left to ferment until the proper aroma is obtained. There is a deliciously fragrant smell in the house devoted to this purpose. The tea is then dried in a machine by hot

blasts, and when ready is thrown into a gigantic sieve—also moved by machinery—which separates the Pekoe from the larger leaf. There is more sifting and picking over by hand for the finer sorts of tea, and a final drying is given to it before it is taken to the packing-house and put up for the wholesale market.

MRS. DONALDSON.—*Lepcha Land.* Sampson Low.
By permission of Messrs. Sampson Low.

The Ganges enters the plains of India by the Hardwar Gap, near Rurki, and is immediately utilised for the greatest system of irrigation works in the world.

The Ganges Canal and the Hardwar Gap

Rurki has risen into note from being the headquarters of the engineers employed on the Ganges Canal. The Ganges Canal has been constructed mainly for the purpose of irrigating the low fertile tracts between the Ganges and the Jumna. The use of the water for irrigation is not obligatory upon the cultivators, but they are generally glad to avail themselves of it. Along the Jumna canals the people do not wait, as formerly, to see whether the crops will be likely to succeed without irrigation, but employ it at all seasons, and are therefore assured of a constant return for the labour. The greatest modern work in India is the Canal Aqueduct over the Solani River at Rurki.

As seen from Rurki, the Himalayas present the appearance of three distinct ranges; the Siwalik Hills, not more than 2000 feet in height; the second, or Sub-Himalayas, rising to 8000 or 9000 feet; while the loftier peaks of the Snowy range are 25,000 feet above the sea.

My road approached the Siwalik Hills, which were steep and covered with jungle to the summit. The gorge through which the Ganges forces its way at Hard-

war made an abrupt gap in their chain, revealing a striking view of the second or Sub-Himalayas, which now completely hid the snowy peaks.

About half-a-mile from Hardwar, the point where the canal leaves the Ganges, I stood on the lofty banks of the river, looking down on its clear blue stream. The gorge lay open before me; the hills rose on either hand, covered with a wilderness of jungle; the white pinnacles of the temples of Hardwar shone over the top of a belt of trees; the sacred ghats led down to the water; and beyond all, crowning the huge blue bulk of the Sub-Himalayas, towered the snowy cone of Gungutri. It was an impressive scene. Here was the river at my feet; there one of its most sacred cities; and in the remote distance the snows in which it is cradled. I went down the bank, and there, at the last gate of the Himalayas, where they let its waters out upon the plain of Hindustan, I drank of the Holy River.

BAYARD TAYLOR.—*Travels in India, China, and Japan.*

“No country in the world is so largely dependent on irrigation for its food supply as India, and in no country have irrigation works, on a large scale, been so successfully carried out. Chief among them are the canal systems of the Ganges, Jumna, and Godavari, all of which have carried life-giving water to millions of acres of unproductive land. In the winter and spring months, when the snow lies unmelted on the Himalayan slopes, the great rivers run low, and carry comparatively little water to the plains. It is just at this season that water is urgently required for agriculture, and whole rivers are at this season diverted into the fields. The entire volume of the Ganges at Hardwar is, during the season of low flood, diverted into a canal, and carried by a series of engineering works to the level flats of the United Provinces. Through its agency the Doab or plain between the Ganges and Jumna is watered. Twenty miles below Hardwar, where the Ganges has again developed into a river, it is again diverted by a second great canal. Three smaller canals tap the Jumna and distribute its waters over a vast area. The Son River also provides an irrigation system which is further developed in Orissa and Bengal, where the network of natural waterways does not extend.

“In the Punjab the development of canals for the broad plains between its great rivers is still in progress, and every river in the province is laid under contribution. In Madras the Godavari and Kistna irrigation systems have been in force for many years.”—SIR T. HOLDRICH.—*India.* Clarendon Press, Oxford.

The plains of the Ganges support a dense agricultural population.

The Plain of the Ganges

The great plains of the Ganges are very impressive—so vast, with a stretch, roughly speaking, of 1000 miles, and breadth from 200 to 300 miles ; so populous, yet with such an ancient world-old village life, and dominated always by the tremendous powers of sun and sky. All the way from Calcutta to Delhi, and beyond, this immense plain, absolutely flat, spreads in every direction, as far as eye can see the same, dotted park-like with trees, mangoes many of them, which, thickening here and there into a clump of palmyra palms, indicate the presence of a village. The long stretches of bare land, with hardly a blade of grass, shimmering in the noonday heat ; oases of barley and *dhol*, a shrub-like lentil, patches of potatoes, castor-oil plant, poppy in white flower, small guava trees, indigo, etc. ; here and there a muddy pool or irrigation channel ; a herd of slow, ungainly buffaloes, or the more elegant humped cows, browsing miraculously on invisible herbage, a woman following them picking up the precious dung for fuel ; long expanses of mere sand, with a few scrubby trees, brown crop lands without a crop, straggling natural roads or tracks going to the horizon, strings of peasants passing from distant village to village, donkeys laden with produce, and now and then a great solid-wheeled cart, creaking by over the unbroken land. The villages themselves are mostly mere collections of mud huts, and some are surrounded by rude mud walls dating from older and less settled times.

Here are two peasants drawing water all day from the well to irrigate their rice-field ; one guides the bucket down to the water, the other runs out on the long lever arm of a horizontal pole, and so brings up the bucket again. Here is one watering his fields by hand, carrying pots and emptying them over the thirsty plants. Here

again is the classical picture, the two mild-eyed cows harnessed at the well-mouth. The rope passes over a pulley and draws up a huge skin full of water as the cows recede from the well; then, as they remount the slight slope, the skin again falls to the water. To and fro go the cows. One man guides them, another empties the skins into the water channel; and so day-long the work continues.

In many of these villages the face of a white man is seldom seen. Even such centres as Allahabad are mere specks in an ocean. The railway is a slender line of civilisation whose influence hardly extends beyond the sound of the locomotive whistle. Over the northern borders of the plain the great snows of the Himalayas dawn into sight and fade away again morning and evening, and through its midst wind the slow broad-bosomed waters of the sacred Ganges.

EDWARD CARPENTER.—*From Adam's Peak to Elephanta.* Sonnen-schein.

By permission of Messrs. Sonnenschein.

Magnificent cities, Delhi, Agra, Lucknow, Benares, and others bear witness to an ancient and splendid civilisation. For description see the *Descriptive Geography of Asia.*)

The First View of Delhi

The morning showed a splendid road leading over a boundless plain, covered with fields of wheat, barley, mustard, and poppies, and dotted with groves of mango or tamarind trees. Its aspect continued unvaried for hours as we drove, except that there was once or twice a low red hill in the distance, or a native town with white-washed mosques and mouldy Hindu temples. Gradually the plain lost its mango-groves, and assumed a bleak and sterile appearance. I crossed a river by a handsome suspension bridge; then the Eastern Jumna Canal; and in the afternoon, when still 12 miles from



LUCKNOW.

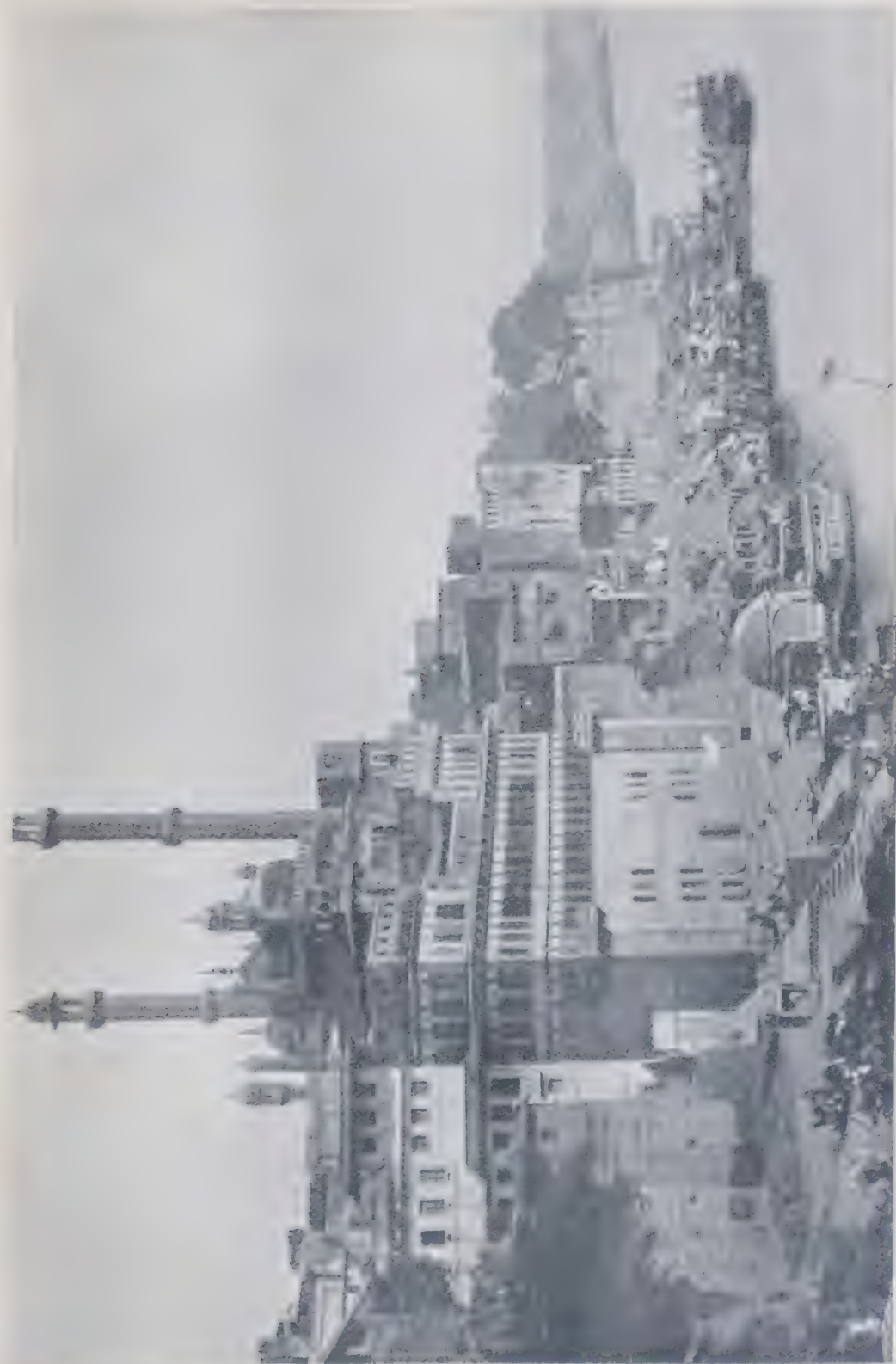
Delhi, descried its mosques on the horizon. As I approached, the great fortress palace, built by Shah Jehan, rose from the plain. The city, which lies to the west of it, was almost hidden by trees, which belt it round. The suburb domes of the great mosque rose above them, and on either hand I could see immense tombs and other ruined edifices scattered far and wide over the plain.

BAYARD TAYLOR.—*Travels in India, China, and Japan.*

“Delhi is still seamed with the scars of her spoilers, and still jewelled with remnants of the gems they fought for. Here is the Jama Masjid, said to be the largest mosque in the world—a vast stretch of red sandstone and white marble and gold, upstanding from a platform reached on three sides by flights of steps so tall, so majestically wide, that they are like a stone mountain. Above the brass-mounted doors rise huge red portals, red galleries above them, white marble domes above them, white marble minarets rising higher yet, with pillars and cupolas and gilded pinnacles above all. Beside the gateways the walls of the quadrangle seem to creep along the ground; then at the corners rise towers with more open chambers, more cupolas, more gilded pinnacles. Within, above the cloistered quadrangle, bulge three pure domes, and a slender minaret flanks each side.”—O. W. STEEVENS.—*In India.* Blackwood.

Benares

Benares is built upon an eminence, and rises in the form of an amphitheatre from the *ghats*, which descend to the river-side. The aspect of Benares from the river is lovely, with its tapering minarets, the splendid mosque of Aurangzib, its well-constructed *ghats*, thronged with bathers of every caste and colour, from the rich and graceful female Brahmin, who performs her ablutions before the rising sun, to the filthy *fakir*, who, after a pilgrimage of 1000 miles, plunges beneath the noonday heat into the waves of the Ganges—the first water, perhaps, that has touched his sacred person for many years. The *ghats*, or bathing-places, are large buildings many storeys high, with handsome verandahs and majestic portals; but their distinctive characteristic is seen in the flights of wide, well built steps which descend to the water-side. These ghats are built by rich Hindus, and



are destined for habitations for themselves, for the priests, and pilgrims. The portion of the city that lies along the river is all ornamented with ghats, for which reason this quarter is considered most holy by the Hindus. The steps of the ghats are never empty. From morning until night they are filled with votaries ascending and descending, with their metal vessels, flowers, napkins, and all the necessary accompaniments of the Hindu ablutions. In the early hours of the morning, and before daybreak, the fairer portion of the most respectable inhabitants of Benares are to be seen. Sometimes there was scarce light enough to distinguish their red or yellow dresses as they returned holding their *lodhas* (oblation cups) filled with the sacred water of the river. A few hours later a different scene presents itself. The handsome platforms of the ghats are filled with Brahmins, who make a great display of boxes, little pots, Khasso grass, sandal-wood powder, sandal oil, and the many things which luxury has invented to aid the ceremonies. There is to be seen a follower of Vishnu, who, having completed his ablutions, is engaged in marking himself with horizontal or vertical lines or circles of yellow or red paint. At a little distance may be seen a votary of Siva, painting himself in vertical stripes, or in triangles of red or white. Another group may be seen, who, with hands uplifted in prayer, make their libations to the sun, the great vivifier. Others are drawing water in vases of copper from the sacred stream and pouring it back again. Still later in the day the concourse on the steps becomes of a more mixed character. Whole families are now preparing for their libations; strangers from distant parts of India, who have reached the term of their pilgrimage, approach the sacred flood, which during whole years has been the object of their longing aspirations.

BARON ERICH VON SCHOMBERG.—*Travels in India and Kashmir*.
Hurst and Blackett.

The capital of Bengal is Calcutta on the Hughli distributary of the Ganges.

Calcutta

On Monday morning we were in the muddy estuary of the Hughli. We anchored in the afternoon off Sangar lighthouse, to wait the morning's tide. At nine next morning we steamed up the river, between flat banks dotted with palm-trees and low huts. We reached our moorings about sunset, amid a forest of ships' masts and black funnels, with crowds of smaller craft.

In driving through the streets for the first time, the impression made upon me was that Calcutta is in every respect worthy of being the capital of British India. Unlike Bombay and Madras, it has, among other good streets quite European, one, Old Court-House Street, so fine and wide, and with shops so brilliant, that no part of London would be ashamed of it. The European residences, splendid mansions each within its own compound, form a noble line of street. The breadth of the great thoroughfares, the size and imposing style of the residences which line them, the arrangements necessitated by the climate, which demands air and shade, and makes necessary a garden, all tend to spread the European portion of Calcutta over such an extent of ground as no other capital can display.

The glory of Calcutta is the Maidan or Park. In shape it is a large parallelogram. At one end of it stands the Government House, stately and imposing, and near it the Town Hall, Treasury, and High Court. Opposite is Fort William, occupying the centre of the plain, which is a mile and a half in length, and beyond, the fine spire of the Cathedral, piercing the sky. Along the one side is the noble street, or range, of Chowringhee, with its princely dwellings; while parallel with and opposite to it flows a great river, such as is not to be found in any other city in as close proximity at once to the Park, the fashion

able drive, and fashionable homes; and, moreover, this river is the Hughli branch of the old Ganges.

The native town covers 6 square miles, and contains nearly half a million natives, exclusive of those in the suburbs. The streets are generally narrow, and the dusty brick houses which line them have not a single picturesque feature. The bazaars would be equally uninteresting, being like all similar cool and shaded lanes for merchandise in the East, were it not for the dense crowds who move through them.

DR. NORMAN MACLEOD.—*Peeps at the Far East.* Strachan and Co.

The plains of the Indus, the Punjab, are drier and less fertile than those of the Ganges. They have more rain than Egypt, which they somewhat resemble. Irrigation is bringing more land under cultivation. The largest town is Lahore.

Lahore

The stern necessities of English military life have had no reverence for the relics of departed greatness, and there is only one part of the Fort and Palace which is not put to some practical modern use. There is a small though costly marble pavilion, inlaid with flowers wrought in precious stones, known by the significant name of the *Naulakha*, the building which cost nine lakhs. The Palace of Mirrors is a much more striking object, and the iridescent sheen of its fragments of looking-glass of different colours, set in arabesque patterns of white cement, at once attracts attention. It is historically interesting as the scene of the formal transfer of the sovereignty of the Punjab to the British Government. From the upper tower the finest view of Lahore and the surrounding country is obtained, including the minarets of Shahdara, the river Ravi, the broad plain in front of the citadel, the mausoleum of Ranjit Singh, the Jama Masjid, the city, and, in clear weather, a distant glimpse of the Himalayas.

The Jama Masjid is the most striking building in Lahore, and its white domes and lofty *minars* may be seen for miles around.

The general aspect of the city from without, excepting on its northern front, is not imposing. The Hindu temples are small and poor in outline, and neither they nor the cupolas of the mosques sufficiently break the monotonous horizontal lines which are the chief features of the view. Within the city the streets are narrow and winding, but some of them, from their overhanging balconies of wood curiously carved and coloured, the striped awnings over the shop fronts, and the streamers of bright-coloured clothes hung at intervals across from balcony to balcony, present much that is picturesque.

In the immediate vicinity of the city the country is tolerably well-wooded, but the trees are deficient in size and variety. Here and there groups of trees of denser foliage and taller growth indicate the sites of Ancient gardens.

Gazetteer of the Lahore District. Official.

Rajputana, in the latitude of the desert of North Africa, is a desert region.

The Desert of Rajputana

The vast tract stretching from Sind on the west, northward along the southern Punjab frontier to near Delhi on the north-east, is sandy, unproductive, and ill-watered, improving gradually from a mere desert in the far west and north-west, between Rajputana and Sind, to comparatively habitable and fertile lands towards the north-east. The character of the desert region is everywhere the same. It is covered by sandhills, shaped generally in long straight parallel ridges. Some of these ridges may be two miles long, ranging from 50 to 100 feet in height. At a distance they look like low hills. Their summits are blown up and curved like waves by the action

of the periodical westerly winds; they are sparsely clothed with stunted shrubs and tufts of coarse grass in the dry season, and the light rains cover them with vegetation. The villages within the deserts cannot be reckoned as fixed habitations, for their permanence depends entirely on the supply of water in the wells, which is constantly failing; and when the water gives out the village must shift. The cultivation is everywhere poor and precarious, though certain parts have a better soil than others, and some tracts are comparatively prosperous. The principal towns within this region are well built and fairly prosperous; they have for ages managed the traffic across these deserts.

As the Aravalli Mountains approach Ajmere from the south-west, their continuous chain breaks up into separate hills and sets of hills. Here is the central midland country of Rajputana. The town of Ajmere stands among the disunited hills, towards the highest level of an open table-land spreading eastwards towards Jaipur, and sloping by degrees to all points of the compass. From Ajmere the Aravallis, trending north-eastward, never reunite into a chain, though their range-direction is very plainly denoted by successive hills and rocky eminences. Their line still serves to divide roughly the sandy country from the kindlier soil on the south and east, though as the ranges break up its correspondence with any such division becomes more and more indistinct. Whereas from Abu north-east to Ajmere the unbroken range stands up like a barricade and effectively protects the country behind from the influx of sand, beyond Ajmere the sand has drifted through many openings and intervals among the hills, and has overlaid large tracts. Against the hills that surround the city of Jaipur the sand lies piled up like a snowdrift on their western face.

Rajputana, south-east of the Aravallis, in contrast to the sandy plains of the north-west, has a very diversified character. It contains extensive hill ranges, and long stretches of rocky wold and woodland; it is traversed by

considerable rivers, and in many parts there are wide vales, fertile table-lands, and great breadths of excellent soil.

The Rajputana Gazetteer. Official.

Above the southern margin of the plains of Northern India rise the marginal heights of the Deccan Table-land which occupies most of Peninsular India.

The Highlands of Central India

The general level of the plains of Central India has by gradual steps reached an altitude of about 1000 feet above the sea. As the traveller proceeds towards the interior, he begins to come on ranges of hills, at first generally low, but in places attaining at once a height of about 1000 feet above the level of the plain, and beyond them peaks and plateaus evidently of much superior elevation. Valleys penetrate the hills, by following which he may rise gradually to these higher regions; and soon he will exchange the rich cultivation of the flat land through which the railway passes for unreclaimed waste and rugged, forest-covered steeps. He will now find himself in a region where all appears chaos, where hill after hill of the same wild and undefined character is piled together, where the streams appear to run in all directions at once. He will find that at a height of about 1000 feet above the plain (2000 feet above the sea) the hills have a tendency to spread out in the form of plateaus, some comprising the top of only one hill and of small area, others a group of many hills, which support, like buttresses, on their summits, large level or undulating plains. From these again he will find, shooting still higher, a good many other solitary, flat-topped hills, reaching nearly 3500 feet, some of which in like manner unite into plateaus at the same elevation. Higher than these, but never assuming the character of a plateau, he will see



here and there a peak rising to nearly 5000 feet above the sea.

The Highlands of Central India may perhaps properly be said to terminate where the steep southern face of the Maikal range, trending away to the north-east, culminates in the high bluff promontory of Amar Kantak. Standing here, on this prominent point, the very focus of India, the eye ranges over a panorama perhaps inferior in extent to no outlook in the peninsula. The rain that here seldom ceases for more than a few days at any part of the year forms the first beginnings of those great rivers whose waters flow in opposite directions to the seas on either side of India. The infant Narbada bubbles forth at the feet of the observer, enclosed by religious care in a wall of masonry and surrounded by Hindu temples, and thence meanders on for some miles through a narrow glade carpeted with beautiful grass, and fringed by forests of sal; at first a tiny burn, but growing rapidly by union with others, till some 3 miles from the fountain it leaps over the edge of the plateau in a clear shoot of about 30 feet: 750 miles farther on it rolls, a mighty river, into the Gulf of Cambay. A little to the north of the source of the Narbada rises the Johila, which shortly joins the Son, also born in these hills, and flows north into the Ganges; while still only a few steps from these another little stream bubbles forth, and shortly tumbles over the sheer cliff to the south, and mingles with the great Mahanadi, which drains the plains of Chhatisgarh into the Bay of Bengal. From this height of 4000 feet the eye embraces a view of three-fourths of a circle, uninterrupted by anything but the blue haze of distance. Far below to the south, lying like a chessboard, is the open cultivated plain of Chhatisgarh, stretching out to the uttermost range of vision. To the east and north, 2000 feet below, appears a flat sea of greenery, broken here and there by an isolated peak. In the faint distance beyond rises another wall of rock, visible only on a clear day as a faint, violet coloured shade across the sky. The

green plain is a vast forest of sal, unbroken by tillage and scarcely inhabited by man ; and the rocky rampart beyond is the buttress of another table-land.

CAPT. J. FORSYTH.—*The Highlands of Central India.* Chapman and Hall.

The western escarpment of the Deccan Table-land is called the Western Ghats. Bombay is at their base in the north.

Bombay

Bombay, the most important commercial city of India, possesses one of the most perfect natural harbours in the world. It is a large, wide, landlocked expanse of water, enclosed by a number of small islands very close to each other, between which and the mainland there is a large channel most effectually protected on both sides, and of sufficient breadth and depth to allow almost any number of ships, of the largest size and tonnage, to anchor within easy distance of the shore. The town of Bombay itself is really situated on a cluster of small islands, connected with each other by causeways, but at the present time the casual observer would take them for only one, divided from the mainland by a narrow creek. The city, particularly as viewed from the deck of a ship on entering the harbour, is very picturesque. It is irregularly built, with a background of hills clothed nearly to their summits with coco-nut trees and waving palms. These afford shelter to numerous white bungalows, gleaming here and there amidst the dark foliage. The whole forms a perfect tropical landscape, particularly striking for those who make acquaintance for the first time with any part of our Indian possessions.

DR. W. WAKEFIELD.—*Our Life and Travels in India.* Sampson Low.

By permission of Messrs. Sampson Low.

For a very vivid description of Bombay, particularly of the native quarter, see SIR EDWIN ARNOLD, *India Recalled*, pp. 54-63.

Over the Ghats to Poona

Leaving Bombay the traveller threads the thoroughly Hindu suburbs, his train flying through groves of date- and coco-palms, amid temples, mosques, synagogues, and churches; dyeing-grounds spread with acres of new-dipped brilliant silks and calicoes; by burning-ghats and burying-places; by mills, stone-yards, and fish-drying sheds, through herds of wandering brown sheep and grey goats, droves of buffalo, and great throngs of busy kine. Crossing an inlet of the sea at Sion Causeway, the line next coasts the island of Salsette amidst the most characteristic Oriental scenery, and arrives by many a low-roofed village and tangled patch of jungle at Thana. Here the outlying spurs of the Sahyadri mountains, steep eminences, coloured red and black, and capped with extraordinary square rocks, like walled fortresses, or domes and pinnacles, constantly resembling temples, shut in the sea flats upon which the town stands. Crossing to the mainland, the railway proceeds along the banks of a creek, lined with palm-groves, mangoes, and fig-trees, to Kalyan, which was in far-away times a very large and flourishing place. The vast wall of the Sahyadris is closely approached. The pointed buttresses of the Parsik, the flat rampart of Parbul, the two straight peaks of Jano Machchi, the "Cathedral Rocks," and many another striking mountain mass, appear prominently along this great barrier, which runs north and south for 220 miles, affording only two breaks in all the extent of the continuous ramp where a cart road or a railway could be constructed. At Karjat the railway begins to climb by a zigzag route of 16 miles from the steaming coast up to the breezy Deccan. In that distance powerful engines lift the train nearly 2000 feet, by gradients often as steep as 1 in 37, dashing over aerial viaducts, diving into tunnels, rushing into dark cuttings, amid scenery alternately terrible and lovely, which now presents fair and

far-stretching plains, dotted with rice-grounds and villages, and now abysses of awful depth, down which the gaze plunges 1000 feet, awed yet fascinated by the combination of gloomy rock and gleaming verdure, of streams trickling or foaming through the lonely glens, and solitary hamlets shrouded by palms, emerging at last on to the plateau of Central India, upon the wide plains and rocky flats of the Deccan. Our train flies along till Poona is reached, and we descend at the capital of the Mahrattas.

Twenty-three years will naturally make a difference, and Poona in that period has become a much larger and handsomer station. The city itself, however, remains almost exactly what it was. The same picturesque crowds; the same painted house fronts open their title shops to the chattering street. There are still the old temples in full swing.

The afternoon is fixed for an expedition to the Diamond Garden, where the vegetation of the Deccan is seen to perfection, sacred fig-trees, and palm clumps, bamboos, and tamarinds, mangoes and the gold-flowering baubul, making a delicious shade. Parvati's Hill, with the renowned temple on its summit, overlooks it. A long and winding flight of spacious steps leads up to the shrine, so gradual that mounted elephants can quite easily carry visitors to the platform of the deity. The view thence is simply perfect, as a landscape of Deccan hills, fields, and woods.

SIR EDWIN ARNOLD.—*India Revisited*. Trubner and Co.

By permission of Sir Edwin Arnold.

Much of the Western Deccan is covered with rich black soil, specially suited for cotton. In the south a break in the table-land, called the Palghat Gap, affords an easy route from west to east. Immediately to the north of this gap rise the high Nilghiri Hills. The largest city of the Central Deccan is Haidarabad, the capital of the Dominions of the Nizam of Haidarabad.

Across the Deccan to Haidarabad

The long journey from the foot of the Nilghiris to the dominions of the Nizam takes the traveller through a good sample of the vast southern plateau of India. The country nowhere greatly varies in character. Numberless little villages of huts, thatched with the plaited palm leaf, dot these interminable fields of millet, cotton, tobacco, saffron, castor-oil, rice, and grain. Wherever permanent water occurs the native population clusters thickly near it, to profit by the precious liquid, which is lifted in all sorts of ancient devices upon the thirsty land, and rapidly clothes it with a thick robe of fertility.

On the following afternoon we reached Wadi junction, from which there is a run of only twenty hours to Bombay. This is a true Deccan country, flat and dry, with groups of thorn-trees, and walled villages, and here and there ranges of bare and dark hills, monsoon worn, and crowned with disused fortresses. Where water occurs the villages thicken, and the jungle grows into forest.

The hot weather has now fairly commenced, and the vast plains of the Deccan glow and shimmer under the fierce sun as our train journeys to the wild districts outside Secunderabad and Haidarabad. The country in the vicinity of the Nizam's city is all of granite and syenite, rising into lofty, broken ridges, or scattered in huge, tumbled fragments over the red and black fields. Enormous crags of syenite, heated by the sun, and then cooled by rain or chilly nights, have split in all directions, and the winds and water, getting into the chinks, eat away the interstices, until each vast crag is changed into layers of massive masonry, resembling the work of giant architects. Sometimes these dissevered masses rise one above another in the form of a minaret, or square pillar, the summit crowned by a stone so carved and fluted by the weather of countless centuries that it is difficult to

believe it natural. Amid these reefs and splinters of volcanic stone are found gold, iron, and precious stones : and as we approach Haidarabad one sees on the right the great rock of Golconda, rising above the black crags of the plain.

Haidarabad is unquestionably one of the most peculiar and interesting cities of India, although of no ancient foundation and possessing no very remarkable buildings. Outside its grey and white walls runs the river Musi, in stony channels which are filled with a turbid flood during the rains, but at other seasons trickle feebly, with a chain of shallow pools, where elephants bathe and the town washing is clamorously done. The rocky stream is spanned by three broad bridges, separating the Hindu suburbs from the town proper, wherein almost all is Mohammedan in character. The long whitewashed streets of the capital, with their shop fronts formed by Saracenic arches ; the mosques occurring at frequent intervals ; the tall sculptured minarets ; the signboards bearing Persian, Arabic, or Hebrew inscriptions, give the general impression of a sort of Indian Damascus or Cairo.

SIR EDWIN ARNOLD.—*India Revisited*. Trubner and Co.

By permission of Sir Edwin Arnold.

On the eastern coastal plain is Madras.

Madras

Madras at first sight presents a disappointing aspect. Seen from the roadstead, the fort, a row of merchants offices, a few spires and public buildings, are all that strike the eye. Roughly speaking, it consists of Black Town, an ill-built, densely-populated block, about a mile square ; the business part of the city, containing the banks, custom-house, high court, and all the mercantile offices. The last, for the most part handsome structures, lie along the beach. On the sea face of Black Town is the

pier of the new harbour. Immediately south of Black Town is an open space, containing the fort, esplanade, brigade parade ground, Government House, and several handsome buildings on the sea face. West and south of this lung of the city come a series of crowded quarters known by various native names, while west of Black Town lie the suburbs, adorned with European mansions and their spacious compounds or parks.

Madras, notwithstanding its exposed situation, ranks third among the ports of India. The lighthouse, 125 feet high, is visible from a ship's deck 15 miles at sea. The Madras roadstead, like the whole line of the western coast of India, is liable to be swept by hurricanes of irresistible fury, which occur at irregular intervals of years, generally at the beginning of the monsoons in May and October.

SIR W. W. HUNTER.—*Encyclopædia Britannica*. A. and C. Black.

By permission of Messrs. A. and C. Black.

Burma is the eastern extension of India.

Burma

The country consists of the broad basin of the Irawadi River and its tributaries, of the narrow, rugged country drained by the Salwin River, of the small Sittang valley, and of two narrow strips of territory between the mountains and the sea, to the north and south of the Irawadi River, which two strips are called respectively Arakan and Tenasserim. Open and rich plains are found only in the Irawadi valley and in the deltas of the Salwin, Koladan, and Sittang rivers. For the rest, the province consists mainly of hills and broken country. On the north lie the ranges which look down on the Assam valley, at one point said to reach a height of nearly 12,000 feet, and outliers come down far into the valleys of the Irawadi. An immense mass of mountains,

culminating in the snow-clad hills beyond the Chinese city of Tali-fu, separates Burma from China on the north-east. The whole of the Shan States is, so far as we know, an upland tract, cut here and there by deep clefts, through which wind the Salwin and other rivers. Buttresses of the Shan Mountain country come close to the Irawadi River at the Ruby Mines, and at Mandalay. Above the Ruby Mines the hills rise to over 6000 feet, and the mines themselves are situated on an upland plateau 4000 to 5000 feet above the sea. The Shan hills cover the upper basin of the Sittang, reaching a height of about 7000 feet, and thence cross over to the valleys of the Salwin and Cambodia rivers. Lesser highlands separate the Irawadi and Sittang valleys; another range forms the backbone of Tenasserim and of the Malay Peninsula; and the remarkable hill of Popa, standing alone, rises to a height of nearly 5000 feet, and is visible all across the Irawadi valley.

After the mountains, the most important physical feature of Burma is its great rivers. The Irawadi, with a course of probably 1100 miles, is navigable by big river steamers from Rangoon to Bhamo, a distance of nearly 760 miles; some hundreds of miles of cross channels and deltaic mouths are similarly navigable. The Salwin and its tributaries are navigable by small steamers for only about 80 miles from the sea; beyond that distance the Salwin River is barred by many successive cataracts and rocky barriers. All these streams and many more are in the flood season navigated by multitudes of native craft. Owing to the heavy rainfall in the delta and on the mountains, all the rivers of Burma are subject to great floods in the rainy season. The rivers rise high above their banks and spread themselves over the country. Sometimes the water of the Irawadi spreads over a breadth of 20 to 25 miles of delta country. Even at Mandalay, 500 miles from the sea, the river covers a breadth of 5 miles during the rainy season. Many hundreds of square miles that used to be flooded yearly



MAIN STREET OF MANDALAY.

have been protected by embankments made during British rule, and behind these embankments great areas have been cultivated by rice-growers. In the tracts not so protected, hundreds of villages are submerged for a few weeks every year. People living in islands or on very low-lying lands leave their homes and go elsewhere during the flood season; but in most villages the people merely move up to their upper storey. The houses are all built on piles; the flood waters move very slowly and gently when they spread over the country. Every house has a boat or canoe; every man, woman, and weaned child can swim; and if the baby by chance rolls off the verandah into the water below, the mother or grandmother dives after it and picks it out.

The staple industry of the country is agriculture, and about three-quarters of the working people are employed more or less directly on the soil. The remaining quarter are fishermen, boatmen, foresters, traders, shopkeepers, and craftsmen of various kinds. The one great product of Lower Burma is rice. There are rice mills constantly at work at the rice ports during the season. The mill-owners buy the rough paddy from the rice-growers and convert it into the product required by the markets of Europe and China. After agriculture, the next most important industry in Lower Burma is the fishery industry. A good deal of fish is caught along the coast, but the bulk of the take of fish is from the rivers and inland waters left by river floods. Some is eaten fresh, but the most part is dried or salted. Upper Burma exports many thousand bales of cotton to China, and produces wheat and pulse for export. For some time it has practically supplied the markets of the world with teak. Among other forest products the most important are cutch, a gum largely used in trade, rubber, and wild tea. The tea leaves are pickled in salt water, allowed to ferment, and eaten as a condiment with rice, fish, and food of all kinds. The mineral products of Upper Burma are various. Iron, copper, lead, gold, and silver are all

found. The most important mineral product of the country will probably be its coal. The chief source for the supply of jade to the markets of China and Japan is in Upper Burma.

The products of Upper Burma about which there has been most talk are its rubies. Good rubies are among the most costly of precious stones. Weight for weight they are worth much more than diamonds, and flawless rubies of any size are very rare gems. The Burma mines are the only source in the world for rubies of the finest colour.

SIR CHARLES BERNARD. — *Scottish Geographical Magazine*, February 1888.

By permission of Sir Charles Bernard and the Royal Scottish Geographical Society

Teak-cutting in the forests of Upper Burma is carried on much like lumbering in Canada.

Teak - Cutting

Burma possesses many valuable woods, but the pre-eminence of teak is such that for general purposes timber has come to mean teak timber. Teak possesses the advantages of being nearly all heart-wood, having considerable strength, with moderate hardness and weight, working easily with axe, saw, and chisel, taking nails, and, above all, not rusting nails or iron in contact with it. It has a serviceable brown colour, and an odour by which it may always be distinguished, due to the presence of an oil which repels the attacks of insects, notably of the termites, and which protects it from decay.

The best way to get teak dry for floating is to ring or girdle the trees. The bark and shallow sapwood are cut through with the axe; the leaves wither and the tree dies. In two or three seasons the timber is light enough to float, and meanwhile it is not exposed to the danger of being burnt or overseen in the undergrowth, as it might be if

felled and left for a season. The tree is eventually felled at the level of the girdle, but if buttressed or unsound is felled much higher.

After felling, the trees are cut into suitable logs for dragging. The latter is the most arduous part of the business. From the stump to the nearest floating-stream may be a mile or two of heavy country. Elephant power is a most valuable adjunct for the work. The rainy season, when brooks and streams are full, the ground moist and slippery, and the weather cool for the animals to work, is the time chosen for dragging. The corners of the log are cut away at one end, and a drag-hole made for the elephant-chain and the subsequent raft-ties at each end. The dragging paths get worn into troughs, in which water lodges and facilitates the work. Every brook on the way is utilised, for though too scanty to float the logs, it lightens the labour. Elephants are heavy enough for timber work at eighteen years, and are at their prime from thirty to sixty. Tuskers are of use for manœuvring the logs in the shallow streams and getting them off shoals.

The logs are not launched into the main stream or river until the last freshets of the season have gone down, for fear of the timber becoming unmanageable. The logs are allowed to drift singly as far as the deep water, where they are stopped by a boom, for sorting and rafting to port. On the Irawadi and Sittang the main water-course is available for rafting, but on the Salwin only the last 60 miles below the rapids. The Salwin tears its rugged course through the limestone mountains which occupy the centre of the eastern peninsula, tapping teak localities on a good part of its way. Deep tranquil stretches alternate with furious rapids, the violence of which may be judged from the fact that teak logs are often shivered to splinters. The foresters have to bide their time till the logs reach the rope-station or boom and can be sorted. In the south-west monsoon the logs have to be salvaged one by one by men in canoes. The deep water raft consists of five to ten tiers of as many logs

each, securely bound with rattan by the drag-holes to cross-poles, and linked with the same material. The raft is manned by four or five men, and is often several weeks on its journey. It may not have to bring up until it reaches tidal waters, when it is easily moored. But where the raft has to be stopped against the full force of a three- to five-knot current a remarkable device is employed. Two ten-foot handspikes, with a shoulder two feet above the joint, have mooring-rattans from each end of the raft, 100 feet long and an inch thick, bent on to them. One of these is sent ashore from the forward end of the raft, and worked like a plough in the bank, going deeper as the raft slues round and the tension increases, and so stopping its way by degrees. If the first attempt fails, another is made from the other end of the raft, which is now the forward one. Arrived in port, the logs are dragged up the mud bank by elephants. If the path is blocked, a powerful elephant sometimes carries a log bodily.

M. AND B. FERRARS.—*Burma*. Sampson Low.

By permission of Messrs. Sampson Low.

Mandalay is the capital of Upper, and Rangoon of Lower Burma.

Down the Irawadi from Bhamo to Mandalay

Our start downwards is under the most propitious circumstances. The mountains of the Celestial Empire rise clear and sharp against the bright blue sky, and the long winding stream glitters in the sunlight. The first gorge below Bhamo presents some very fine scenery. The Irawadi narrows to a few hundred feet, and at one point passage seems impossible, the channel being so contracted. The climax is reached in a towering precipice which rises grandly from the river's edge. Near its base, on the pinnacle of a detached rock, is perched a small pagoda, its golden pyramid and scarlet base standing out

against the dark green background, and glowing in the sunlight. It does not take one long to reach the hot lowland, and one feels again the tropical air full of languor. The river grows wider and wider as we approach Mandalay. Pagodas stud the banks of the stream, and, some 9 miles above the capital, the vast masses of the Mingun Pagoda are to be seen, picturesquely placed on a knoll above the river. The mountains lose their stately forests and much of their height as the steamer nears the capital, so that the approach to Mandalay is not impressive. It would be difficult to make an impressive scene out of muddy waters, sandbanks, and barren hills.

The streets of Mandalay are very wide and not paved in any way, the result being that the dust is suffocating. The shops and houses on either side do not present an attractive appearance, and the traveller wonders whether these are not merely the suburbs, until a sudden turn brings the fort into view. The fort might be called the Kremlin of Burma, but in size it would contain several of the Russian citadel. It is a square of a mile and a half each way, surrounded by a deep moat, 150 feet wide, crossed by five bridges. In the royal days before 1885 state barges floated upon the waters of the moat, but to-day nothing breaks the placid surface save countless lotus-pads, bearing aloft their pink and purple blossoms. The entire square inside the moat is encompassed by a brick wall fully 30 feet high, and deeply toothed. The bricks of this wall are of a deep dark-red colour. Over the twelve entrances rise fantastic many-storied towers. The cornices of all these towers, as well as all the royal buildings of the fort, are of beautifully carved wood, flamboyant in design, and resembling the tails of dragons thrown flauntingly into the air.

Mandalay Hill rises in the background, upon which gleam the white pagodas of the people, while behind cluster the temple of the Seven Hundred Pagodas.

W. M. SHOEMAKER. — *Quaint Corners of Ancient Empires*. G. P. Putnam's Sons.

By permission of Messrs. Putnam.

Rangoon

At its entrance the Rangoon River is 2 miles in width, while opposite the city, 12 miles above, it narrows to about a third of a mile, with four or five fathoms' depth. Lying upon level ground, the city extends for about a mile along the river, and perhaps three times that distance inland. From the steamer's deck we can see an English cantonment, two or three European churches, and several large pagodas with gilded and richly ornamented spires. Beyond the city we see a jungle of palms, bananas, and bamboos stretching away, a wavy sea of green, to the horizon. The country about Rangoon, the delta of the great Irawadi River, is low, sandy, and muddy, and subject to tremendous floods in the rainy season. The streets are laid out at right angles, and most of them are broad, macadamised, and clean. The greater part of the European private residences are raised on piles. These are built of teak and have tiled roofs, but the native quarter is very mean-looking, the huts being of bamboo, with palm-leaf thatched covers.

The most wonderful sight in Rangoon is the great Shoay Dragon, or Golden Pagoda. It is situated about a mile from the city, upon a hill 80 or 100 feet in height. The entrance, guarded by two huge griffins of brick and mortar, passes between long narrow sheds, beautifully carved and gaudily painted in vermilion and gold. Thence, mounting a very dilapidated staircase, the immense stone terrace upon which the pagoda itself stands is reached. This is nearly 1000 feet square. The base of the structure, standing at its centre, is octagonal shaped and 1500 feet in circumference, while the entire height of the pagoda is 300 feet. It is built of solid masonry and lime, covered with gold-leaf, and gradually tapers to a spire, which terminates in a *tee* or umbrella, an open iron-

work cap, 20 feet in height. The spire blazes so fiercely under a noonday sun as to almost dazzle the beholder.

F. VINCENT.—*The Land of the White Elephant.* Sampson Low.

By permission of Messrs. Sampson Low.

TROPICAL COLONIES

Much of India, as of Queensland, Rhodesia, and the Sudan, lies between the tropics and the equator, though for convenience the whole of these British possessions have been treated together. The remaining British possessions lie wholly within the tropics.

CEYLON

Ceylon lies to the south of India, and is covered with dense tropical vegetation. The capital is Colombo.

Colombo

From the sea we behold first the mountain zone, rising in one mighty upheaval from the plains of Ceylon, capped by the venerable peak named after our first parent. At different elevations there are four extensive ledges, which appear to rise abruptly from the base, and from these a number of lofty mountains raise their rugged brows to the height of 5000 to 8000 feet. Here we get the best idea of the formation of those highlands whose deep ravines and grassy plains, dense forests and open valleys, gentle streams and roaring cataracts, besides their tens of thousands of acres of tea, we shall presently explore. As we approach nearer a scene of verdant loveliness is disclosed.

Colombo, like so many eastern towns, has separate business localities for natives and Europeans. The European official and business quarter, a block of about half-a-dozen fine streets, is known as the Fort. The

most extensive and beautiful division of Colombo is that devoted to residential purposes. As we leave the Fort by the seaside in a southerly direction we drive across a fine open green, with the sea on one side and the lake on the other. This road continues along the coast for about 100 miles. It passes through a forest of palms, with frequent avenues at right angles, down which we catch glimpses of the shore. For the first 3 or 4 miles well-kept bungalows, or compounds, are noticeable at frequent intervals. The landscape in this direction varies little, yet it is never wearisome. The brown-thatched huts, groups of gaily-clad natives, animals and birds, add life to a scene that baffles description. Garlands and creepers festooned from tree to tree; huge banyans stretching in archways completely over the road, with the stems all overgrown with ferns, orchids, and other parasitic plants; here and there a blaze of the flame-coloured gloriosa, golden orchids, various kinds of orange and lemon trees covered with fragrant blossoms, climbing lilies, an undergrowth of exquisite ferns of infinite variety, all crowned by slender palms 90 or 100 feet high,—it is vain to attempt a description of such a scene.

H. W. CANE.—*Golden Tips*. Sampson Low.

By permission of Messrs. Sampson Low.

The island is exposed to the full force of the southwest monsoon, which, as in peninsular India, breaks with great violence and suddenness.

The Change of the Monsoon

May is signalised by the great event of the change of the monsoon, and all the grand phenomena which accompany its approach. Long before the wished-for period arrives the verdure produced by the previous rains becomes almost obliterated by the burning droughts of March and April. The deciduous trees shed their

foliage, the plants cease to put forth fresh leaves, and all vegetable life languishes. The grass withers on the baked and cloven earth, and red dust settles on the branches and thirsty brushwood. The insects, deprived of their accustomed food, disappear underground, or hide beneath the decaying bark; the water beetles bury themselves in the hardened mud of the pools, and the snails retire into the crevices of the stones or the hollows amongst the roots of the trees, closing the apertures of their shells with the hibernating epiphragm. Butterflies are no longer seen hovering over the flowers; the birds appear fewer and less joyous, and the wild animals and crocodiles, driven by the drought from their accustomed retreats, wander through the jungle, and even venture to approach the village wells in search of water. Man equally languishes under the general exhaustion. The sky assumes the sullen tint of lead, and not a breath disturbs the motionless clouds that hang on the lower ranges of hills.

At length, generally about the middle of the month, the sultry suspense is broken. As the monsoon draws near the days become more overcast and hot, banks of clouds rise over the ocean to the west, and in the peculiar twilight the eye is attracted by the unusual whiteness of the sea birds. At last the sudden lightnings flash among the hills, and shoot through the clouds that overhang the sea, and with a crash of thunder the monsoon bursts over the thirsty land, not in showers or partial torrents, but in a wide deluge that in the course of a few hours overtops the river banks and spreads in inundations over every level plain. All the phenomena of this explosion are stupendous. Thunder and lightning, as we are accustomed to be awed by it in Europe, affords but the faintest idea of its overpowering grandeur in Ceylon. The rain descends in almost continuous streams, so close and so dense that the ground is covered with one uniform sheet of water, and down the side of acclivities it rushes in a volume that wears channels in the surface. For hours

together the noise of the torrent, as it beats upon the trees, and bursts upon the roofs, flowing thence in rivulets along the ground, occasions an uproar that drowns the ordinary voice, and renders sleep impossible. This violence, however, seldom lasts more than an hour or two, and gradually abates after intermittent paroxysms, and a serenely clear sky supervenes. For some days heavy showers continue to fall at intervals in the forenoon, and the evenings are embellished by sunsets of the most gorgeous splendour, lighting the fragments of clouds that survive the recent storms.

So instantaneous is the response of nature to the influence of returning moisture, that in a single day, and almost between sunset and dawn, the green hue of reviving vegetation begins to tint the saturated ground. In ponds, from which but a week before the wind blew clouds of sandy dust, the peasantry are now to be seen catching the reanimated fish; and water beetles revive and wander over the submerged sedges. The electricity of the air stimulates the vegetation of the trees, and scarce a week will elapse till the plants are covered with the larvæ of butterflies, the forests murmuring with the hum of insects and the air harmonious with the voice of birds.

SIR J. E. TENNENT.—*Ceylon*. Longmans.

STRAITS SETTLEMENTS

The southern part of the Malay Peninsula is British. It is especially noted for its tin mines. The chief centre is Singapore, built on an island off the southern end of the peninsula.

Singapore

The Malay Peninsula is a long strip of land, a continuation of British Burma and Siam, extending southward almost to the equator, and separated from the island of Sumatra by the Strait of Malacca, which is used by



THE QUAY, SINGAPORE.

steamers proceeding to China and Japan, as well as by numbers of small sailing craft. The strongly fortified coaling station of Singapore, at the end of the peninsula, is one of the principal British strongholds between Aden and the Far East ; and together with Malacca, the Dindings, and the island of Penang, form the colony of the Straits Settlements. The rest of the peninsula is divided into numerous native states.

The first thing that strikes the traveller on reaching Singapore is the bustle and stir going on around, the busy Chinese hurrying hither and thither, the air of prosperity pervading all, and the rich greenness of the vegetation caused by the moist heat and the constant showers. The Government buildings are palatial ; an excellent club-house overlooks the outer harbour, which is a fine natural anchorage sheltered from the prevailing winds. It faces the China Sea, which is full of ceaseless activity, cargo boats going backwards and forwards, a perfect fleet of steamers, trading with every part of the world, loading and discharging goods, and a constant succession of small boats, carrying passengers, plying to and fro ; Chinese junks with their great brown sails, and sailing craft of every description, which trade between the numerous small and thriving villages dotted around the shore of the many surrounding islands, are busy going and coming, or anchored in the distance off the beach where the native quarter reaches down to the sea. Singapore is a city of considerable size. One portion of it is taken up by the European and business community ; another by the Chinese traders and retail dealers ; Tamils, Javanese, and Malays occupy other portions, and the rest of the town is composed of a polyglot collection of inhabitants, with more than a proportionate number of Chinese, as the shopkeeping and local trade of the country is principally carried on by them. The suburban residences of the merchants are some little distance from the town, and are good substantial houses, each built on a portion of the many small hills which are so numerous on

the island. They stand sequestered in their own grounds, amongst beautiful and shady trees and well kept lawns.

A. B. RATHBORNE.—*Camping and Tramping in Malaya*. Swan Sonnenschein, 1898.

By permission of Messrs. Swan Sonnenschein.

HONGKONG

Hongkong island, off the delta of the Si-kiang river of China, resembles Singapore in being a great trading centre, and is a naval station.

Victoria, Hongkong

When, with the earliest light of dawn, we slowly steamed into this exquisite harbour, its beauty, so suddenly revealed, left me mute with delight. Perhaps the contrast between these encircling ranges of shapely hills and the dead level of the Shanghai coast helps to make them seem more impressive. The harbour is like a great inland lake, so entirely do the jagged mountain ranges of the mainland and the island of Kaulung seem to close round this rocky isle, from whose crowning peak (1825 ft.) floats the Union Jack. It is the termination of the ridge which forms the backbone of the isle, and along whose base extends the city of Victoria, a granite city hewn from the granite mountains, with granite fortifications, granite drains to provide for the rush of the summer rains : yet there is nothing cold in its appearance, for all is gilded by the mellow sunlight. There is so very little, if any, level ground, save what has been reclaimed artificially, that steep streets of stairs lead from the business quarters on the sea embankment right up the face of the hill, the lower spurs of which are dotted over with most luxurious houses and shady gardens, gay with camellias and roses and scarlet poinsettias. In the midst of all is the loveliest Botanical Garden, where all rich and rare forms of foliage, from tropical or temperate climates, combine to produce

a garden of delight, whence you look down upon the emerald green and dazzling blue of the beautiful harbour, where a thousand vessels, and boats and junks without number, can ride in absolute safety.

MISS C. F. GORDON CUMMING. — *Wanderings in China*. Blackwood.

By permission of Messrs. Blackwood.

BORNEO

Of the islands between Asia and Australia Britain owns part of Borneo, most of which is covered with dense tropical forest.

In the Borneo Forest

The country was a succession of knolls or small hills, all densely covered with timber. At frequent intervals creeks and deep ravines, rivulets and streams had to be crossed. The deepest and widest were spanned by Dyak bridges, consisting sometimes of a tree trunk which had been cut down and allowed to fall over the chasm ; sometimes of a single bamboo or two bamboos joined with a slender rattan railing to serve as a balance. Some were as much as 110 feet long, and it required no slight skill to traverse them.

I was struck with the great beauty and variety of the foliage. Hardly two trees seemed alike. Many trees assumed strange shapes, the growth of the roots being especially curious. Instead of converging underground to the trunk, the roots would grow above the surface and meet in mid air, the trunk proper springing from them several feet above the ground. Some of the trunks rose to the height of 20 or 30 feet before sending out a single branch, but from cracks and crannies in the rough bark grew ferns in infinite variety. Climbers and creepers of all kinds and colours clung to the stems and overran the branches, from which they hung in tangled clusters.

Many trees, including several distinct varieties, were pointed out to me as yielding gutta-percha. I asked the



COCO-NUT PALM, NORTH BORNEO.

Dyaks to show me the method of extracting the juice. A notch was cut in the bark, from which the juice slowly oozed, forming a milky-looking mucilage, which gradually

hardened and became deeper in colour as it ran down the tree. The native collectors of gutta-percha make a track through the forest, nicking all the trees as they go, and collect the hardened sap on their return a few days later.

CARL BOCK.—*The Head Hunters of Borneo.* Sampson Low.

By permission of Messrs. Sampson Low.

PACIFIC ISLANDS

Of our tropical possessions in the Pacific, Fiji is the most important.

A Glimpse of Fiji

I have just come in from such a scramble. Certainly those hills of Ovalau are most tantalising. From the sea they do look so attractive, and not particularly difficult to ascend; but when it comes to the attempt, you find that even in the rare instances where the semblance of a footpath exists, it takes a very good scrambler to follow it over great boulders of rock, or up almost perpendicular banks of soapy mud. Should you attempt to leave the path you find it almost impossible to force a passage through the dense underwood; and even the tracks, which from the sea look like grass, turn out to be tall reeds, reaching far above your head, and matted together with strong vines, which totally prevent your advance, and large spiders' webs, which cling to your face and hair. Still, it is worth a considerable exertion, for the reward of at length reaching some point whence you can look down on the lovely sea and all the far-away isles. This island is itself quite beautiful, though by no means a desirable one on which to establish a capital, as it consists entirely of very steep hills, rising to a height of about 3000 feet, crowned with great crags and rent by deep gorges densely wooded. The only available building land is a narrow strip on the edge of the sea; and though, of course, the lower spurs of the hills may gradually be

dotted with villas, there is no possibility of extending the town except by extensive terracing.

C. F. GORDON CUMMING.—*At Home in Fiji*. Blackwood.

“To state that the scenic beauties of the archipelago are charming conveys no adequate conception to the mind. Beauty of the most sublime grandeur is here to be seen ; on the hills and mountain faces, in the narrow glens and gorges, along the windings of the rivers, in the rapid foaming streams, by the silent lakes and marches, and on the widespread plains and valleys—there the eager eye beholds the magnificence of nature, in the tints and shades of verdure and the richly-coloured foliage of the giants of the forest and the creeping vines and leaves ; while the ocean, with its beauties, 'mid the submarine structures, and mighty foaming billows, as they crash against the faces of the ponderous Barrier Reef, impresses the spectator as amazingly he gazes on the surface of the water, over a scene of majestic beauty, wild and terrible at times. In the different countries through which I have wandered I have seen nothing to surpass the natural loveliness of the coral-girt isles of Viti.”—J. P. THOMSON.—*Proceedings and Transactions of the Queensland Branch of the Royal Geographical Society of Australasia*, vol. ix., 1893-94.

The Fijian methods of agriculture may be compared with the details given for other regions.

Agriculture in Fiji

The people live principally on yams, *dalo* or *taro*, bananas, bread-fruit, with fish, fowls, pork, and several kinds of greens. Their drink is generally water, or the milk of the coco-nut.

The yam, *uvi*, is the staple food ; they have about twenty different sorts under cultivation. Some of the varieties are very fine, mealy, and free from fibre, like a good potato. The tubers of some of the kinds do not exceed 2 or 3 lb. in weight, but those of one or two sorts weigh as much as 100 lb. The trees having been felled, and their roots cleared out of the ground, and the grass, etc., burned off, planting commences when the *drala* tree begins to flower, in the month of July or August, according as the season is late or early. All hands assist in planting. The soil is thrown up into small mounds, from 3 to 5 feet apart. On each mound a small yam,

or the crown of a large one is planted. Should the ground be flat, open drains are made to carry off the water, or the ground is thrown up into beds with ditches between, and the yam mounds formed in rows on the beds. The stems of the yams are supplied with canes to climb upon. The canes are generally laid horizontally, supported by forked sticks stuck in the ground, or by the tops of the mounds. The roots or tubers are ready for digging by the beginning of March: the drying of the stems indicates that the tubers are ripe. When dug the yams are stored in airy sheds erected on the fields. They are used boiled, or roasted, or steamed.

There are two kinds of *dalo*, land and water *dalo*. The land *dalo* will only grow where the rainfall is great, and on land from which the water has neither drained nor evaporated after the forests have been cut down. To prevent too rapid evaporation, a few trees are left on the land selected for *dalo*. To prepare the ground the trees are felled and burned, and the grass cleared from roots of grass, weeds, etc. The plants are put down in rows from 2 to 3 feet apart, and less is allowed from plant to plant. Holes about 9 inches in depth are made in the ground with a planting stick, which, before being pulled out, is well shaken to harden the sides of the holes, prevent the ground falling in, and water from passing freely through the soil. This hole catches a considerable amount of rain water as it runs off the ground, and generally retains it during a protracted drought. Besides keeping the *dalo* moist, the depth at which it is planted prevents it throwing out suckers at the top of the tubers which it has a tendency to do where planted near the surface. The part planted is a thin piece cut from the crown of the tuber, with the leaf stalks attached, the leaves being removed to prevent exhaustion. The only care bestowed on the land *dalo* after planting is to keep down weeds, and this weeding is generally done in wet weather, lest the ground should be too suddenly exposed to the drying influences of the sun and air. The place

selected for growing water *dalo* is generally the bottom of a valley, or any place where water is at command. This plant, like rice, requires a constant supply of fresh water. Not a little labour and ingenuity has been displayed by the Fijians in making aqueducts, often miles in length, over ravine and hollow, to carry a supply of fresh water to these plantations. Sometimes the hill-sides are terraced for it. In making the retaining walls for the beds and terraces on the hill-sides, much labour has been bestowed. One bed follows another in succession, the fall from a bed to the one next below it varying from 4 inches to several feet, according to the steepness of the site. The *dalo* grows best in a heavy, stiff, clay soil, and generally takes from ten to twelve months to reach maturity. The decaying of the leaves indicates that the tubers are ripe. They vary in weight from 1 to 12 lb; the average weight, however, is from 4 to 6 lb. They are eaten either boiled or roasted, and are starchy and very nourishing. *Dalo*, along with some sweetening matter, forms the chief ingredient in the native *rakololo*, or puddings. The young leaves, boiled and served like spinach, are an excellent vegetable. There are about eighteen varieties of *dalo* cultivated in Fiji differing principally in the size and colour of the leaves and leaf-stalks. The natives interchange the tops for planting from one district to another, from a cold district to another, from a wet to a dry, and from one kind of soil to another knowing, by experience, that these changes are beneficial and that a larger and better crop is obtained than by constantly cultivating the same sort in the same district or kind of soil.

In selecting a piece of land the Fijians are generally correct as to the kind of land best adapted to the purpose. A temporary dwelling is erected close to the selected land, to which they remove with their families during the season for clearing the land and planting the crop. After this is completed they return to the town, and occasional visits are made to the plantation for the

purpose of weeding, etc. The common people generally assist the chief in the heavy part of his agricultural labour, and the poorer people are aided by their wives. The latter have to carry home from the fields all the yams, canes, etc. They seldom take a crop off the same piece of land for two successive years, except in well-watered districts, when a crop of land *dalo* may be found succeeding one of yams, or the reverse. The land is then abandoned for an indefinite period, until its fertility is restored. When such a system of cultivation prevails a large area of country is required to supply food to a comparatively small population. In the elevated parts of the windward districts little injury is done by the unwooding of much forest land annually for plantations, an equal extent being annually abandoned. After an abundant fall of rain, so rapid is the growth, that the land thus abandoned is speedily covered by a dense growth of trees. The native plan of digging is as follows:—The men provide themselves with a digging stick each, and by repeated blows of these make holes round a piece of ground of about 2 feet in diameter; then by using the sticks as levers this piece of soil is turned over on its side or upside down. Boys follow and break up these lumps by blows from short sticks, pulverising the soil with their hands.

Among native food plants the banana ranks after the yam and *dalo*. This is more especially the case in the interior of Viti Levu, where the people have not so many coco-nut trees as those who live on the coast, and in the smaller islands. Even there bananas are largely used for food, roasted when green, raw when ripe, also cooked with coco-nut milk and the juice of the sugar cane, as a *rakalolo*, or pudding. Banana plantations abound everywhere. They are planted along the sides of the road to shade the traveller from the sun, sometimes forming avenues miles in length. The fruit on those trees is *tabu*, that is, forbidden to the traveller. The *tabu* is invariably respected by the natives. Bananas are planted in rows

and the trees are put down at about 8 feet apart, and the same distance is allowed between each tree. Suckers from the sides of old roots are used as plants, the leaves being cut off before planting for the reason already mentioned. The soil in the place where the young tree is to be planted is dug in a circle of about 3 feet in diameter, and to the depth of 2 feet, and well manipulated. The young trees bear in about two or three years after planting. These plantations are frequently formed on land that has yielded a crop of yams or *dalo*. The latter is sometimes planted along with bananas, whose leaves, as the natives say, shade it from the sun, or, more correctly, they shade the ground and prevent a too rapid evaporation of moisture. The leaves of the banana are often used as plates for serving food upon, as tablecloths, and also for wrapping material. When used for the latter purpose the mid-rib is cut close to the leaf, which is passed several times through the flame of a fire to make it tough and pliable. Thus treated, the leaf does not split readily. The leaves of the *dalo* are also used for the same and similar purposes, for which they are prepared as the banana. The stems of the common banana yield a fibre scarcely inferior to Manila hemp, but it is not extracted.

J. HORSE.—*A Year in Fiji*. Government Official Publication.

Miss Gordon Cumming, in her charming volumes on Fiji, writes:—"The *dalo* is of a bluish grey colour, and both in appearance and consistency resembles mottled soap. Its leaves are like those of our own arum on a large scale, and it is of the same family. The leaves of the yam are like those of the convolvulus, as is also its habit of growth."

"The Fijian huts are, I should think, the finest specimens of savage architecture existing. They are built almost entirely out of the coco-nut tree, and the interior is most elaborately decorated, the beams being covered with thousands of yards of sennit, that is, string made out of the coco-nut fibre, coloured different colours and wound round so as to make beautiful arabesque designs. The mats on the floor are pandanus leaf plaited in beautiful designs, and the walls are frequently covered with native tapa cloth, painted in bold artistic patterns, the predominant colours of which are black, white and yellow!"—HALL AND OBORNE.—*Sunshine and Surf*. Black.

WEST INDIES AND SOUTH AMERICA

The largest of our West Indian possessions is Jamaica.

Jamaica

On the south-eastern side as you approach the island, the Blue Mountains rise up in all their magnificence before you. Softened by distance into a deep azure hue, they are distinguished from the lower ranges of hills which advance gradually to meet them from the verge of the shore on which the city of Kingston stands. These are clothed in luxuriant verdure, and fantastically girdled with clouds.

A lofty mountain range traverses the island, rising towards the northern coast to the height of 7000 or 8000 feet. Where these mountains are abrupt and broken into precipices gigantic trees are to be seen, which appear to take root in the rock itself and spread out their branches over the abyss below. In other places a noisy stream forces its way to the sea, breaking into foam over every impediment.

Look at Jamaica from whatever point of view you may, the grandeur of the scenery forces itself on your notice. View it from the ocean, and how magnificent is its aspect. There are the lofty Blue Mountains, with their summits veiled in clouds. And such forests, impenetrable in many parts from their wild and matted underwood! Or look at it from its own heights, and what a splendid scene presents itself. Mountains immediately around, forming a bold and intrepid foreground; the far-spreading and beautifully diversified landscape beyond, stretching out to the distant sea, which like a sheet of silver extends to the far horizon.



PORT ROYAL, JAMAICA.

Climate and Products of Jamaica

The varied surface of Jamaica, with altitudes ranging from the levels along the sea, up through the plateaus of the western end of the island, to the 7360 feet of the Blue Mountain peaks, affords a great range of climate.

May and October are the two great rainy seasons, in which months, at the new or full moon, it begins to rain, and continues day and night for a whole fortnight with great violence, so that the earth in all level places is under water for some inches.

Jamaica is essentially an agricultural country. The coffee and fruit industries have increased very rapidly during the last fifteen years. Coffee-growing is the best of all these industries, not only because coffee is non-perishable and therefore easily transported, but because there is every indication that the high prices which now rule will continue for many years. Moreover, on the high lands, which are best suited to coffee, the climate is cool and pleasant.

The natural requirements of the banana plant are totally different from the coffee tree; for while the latter flourishes in the cool mountain country, the former requires a hot climate, and will only grow in perfection on the rich plain land. It is true that the small patches of the negroes are often seen on steep hill-sides and far in the interior, but the fruit is generally small and inferior. The large plantations of the white men are always on the flat lands.

There are many fine coco-nut groves on the island, but, owing to the long time necessary for the first crop, not so much has been done as in other industries. The trees seldom bear until seven years old, but once in bearing they continue for a hundred years, and are a veritable mine of wealth. On the same tree blossoms, green fruit, and ripe fruit can always be seen. Coco-nut trees like sea air, and do not do well if planted too far from the



SUGAR CANE CULTURE.

coast. After the first few years they need no cultivation, and the land on which they grow can be put into grass and pasturage.

Oranges grow in perfection on the higher lands. Lemons, limes, grape fruit, shaddocks, and all kinds of citrus fruits, grow well. Most excellent vegetables can be grown and be ready for market between December and March. Jamaica is thus capable of being made the market-garden of the United States during a season in which it would have a monopoly.

The keeping of live stock plays an important part in the agriculture of Jamaica. The stock-farms usually combine from 500 to 1000 acres of grass-land with perhaps as much more of wood-land or ruinate—abandoned land covered with bushes and small trees. The grass-land comprises pimento grass on the highlands and Bahama grass on the lowlands at the coast. Guinea grass, which flourishes in either locality, grows so abundantly that a field of it will keep double the number of cattle that the field would in any other kind of grass. All kinds of stock except sheep are very fond of it.

J. H. STARK.—*Guide to Jamaica*. Sampson Low.

By permission of Messrs. Sampson Low.

“The cotton tree grows to a magnificent height and with magnificent proportions. Nature, in order to sustain so large a mass, supplies it with huge spurs at the foot, which act as buttresses for its support, connecting the roots immediately with the trunk as much as 20 feet above the ground. From its head the branches break forth in most luxurious profusion, covering an enormous extent of ground with their shade. The most striking peculiarity of those trees consists in the parasitic plants by which they are enveloped. These are of various kinds, the fig being most obdurate. The original tree has frequently departed wholly from sight, and I imagine almost wholly from existence. But it often happens that the tree has reached its full growth before the parasites have fallen on it, and then, in place of being strangled, it is adorned. Every branch is covered with a wondrous growth—with plants of a thousand colours. Some droop with long and graceful tendrils from the boughs and touch the ground, while others hang in a ball of leaves and flowers.”—ANTHONY TROLLOPE.—*The West Indies and the Spanish Main*. Chapman and Hall.

Kingston and Port Royal

The dawn was breaking when I came on deck. The Blue Mountains were hanging over us on our right hand, the peaks buried in mist. As so often in the Antilles, a level plain stretched between the sea and the base of the hills, formed by the débris washed down by the rivers in the rainy season. Among cane-fields and coco-nut groves we saw houses and the chimneys of the sugar factories. Presently Kingston itself came in sight, and Up Park Camp, and the white barracks high up on the mountain-side. Between us and the town was the long sand-spit which encloses the lagoon, at the head of which it is built. It is 8 miles long, rising but a few feet above the water-line, nowhere, except at the extremity, more than 60 or 100 yards across. The thundering swell of the Caribbean Sea breaks upon it from year's end to year's end. Where the sand is dry, beyond the reach of the waves, it is thickly planted with palms, and appears from the sea a soft green line, over which appear the masts and spars of the vessels at anchor in the harbour and the higher houses of Kingston itself. To reach the opening into the lagoon you have to run on to the end of the sandbank, where there is a peninsula on which is built the Port Royal so famous in West Indian story. Halfway down the palms the lighthouse stands. Treacherous coral reefs rise out of the deep water for several miles. There are but two channels through which the lagoon can be approached.

As we rounded the point the lagoon opened out. Kingston lay 6 miles off at the head of it, now inside the sand ridge, blue and hazy in the distance. At the back were the mountains. Immediately in front were the dockyards, forts, and towers of Port Royal, with the guardship, gunboats, and tenders, with street and terrace, roof and turret and glittering vane, all clearly and sharply defined in the exquisite transparency of the air.

J. A. FROUDE. — *English in the West Indies*. Longmans.

By permission of Messrs. Longmans.

For a detailed description see *ibid.*, p. 195.

Many West Indian landscapes afford exquisite combinations of mountain, forest, and sea.

Scenery of Dominica

The scenery behind the town of Roseau is beautifully grand; indeed the whole prospect from the edge of Morne Bruce, a lofty table-rock occupied by the garrison, is one of the very finest in the West Indies. The valley runs up for many miles in a gently inclined plane between mountains of irregular heights and shapes, most of which are clothed up to their cloudy canopies with rich parterres of green coffee, which perfumes the whole atmosphere even to some distance over the sea; the river rolls a deep and roaring stream down the middle of the vale, and is joined at the outlet of each side by a mountain torrent, whilst at the top, where the rocks converge into an acute angle, a cascade falls from the apex in a long sheet of silver foam.

I started on horseback with my friend to visit his estate. The ride was most delightful. We went up the valley, forded the Roseau River twice, and pursued an irregular path cut in the side of the mountains. I was particularly struck with the size of the ferns. There were whole forests of them in the depths and recesses of the hills, and I think most stood 20 or 25 feet in height. The wild plantain also was very conspicuous, with its immense leaves rent into slips, its thick bunches of fruit, and the scarlet receptacle of the seed hanging quaintly down the stem of the tree by a twisted rope. After a long ride we came to my host's coffee works and rested ourselves a space. The situation was on a square terrace jutting out from the breast of the mountain, which rose to a great height above it. Palm trees stood around, coffee bushes flourished upon the declivities, and cascades of water burst through the close vegetation. Below lay the valley, the silver waterfall gleamed through an avenue in the hills, and magnificent piles of rock, some-

times black and bare, sometimes green with countless tracteries of creepers, formed the scene right opposite.

H. COLERIDGE.—*Six Months in the West Indies in 1825.* Murray.

The largest of the British West Indies after Jamaica is Trinidad with its wonderful pitch lakes.

Trinidad

The northern coastal range traverses the entire length of the island, and possesses an average breadth of nearly 7 miles. There are generally two ranges, the subordinate one rising immediately from the sea, and attaining an average elevation of 800 feet, and the main ridge, locally termed Cordillera, which varies from 1600 to 2200 feet. There are several high peaks rising out of this ridge. Towards either extremity the ridges fuse together, and form on the east a gradual incline to the sea; on the west descending towards the lower hills of the islands of the Bocas, where the chain is interrupted, to rise again and attain a greater elevation on the adjacent mainland. The valleys are transverse, and of some breadth in the west, becoming merely deep ravines for the passage of the waters to the eastward. They are often contracted near their mouths, expanding in the upper parts into somewhat basin-shaped cavities. The small islands dotting the gulf are detached portions of this hilly system. The declivities are invariably steep, rising almost precipitously from the sea on the north, and descending at high angles to the low land on the south. The whole district is richly clothed with tropical vegetation, frequently characterised by magnificent timber. The purity of the water, the coolness of the nights, and the beauty of the scenery, combine to render this the most agreeable portion of the island.

The central range extends from Point à Pierre on the west to near the southern bank of the l'Ebranche on the east, a length of about 35 miles. When seen from

a distance the aspect is that of a low ridge with occasional elevated peaks. Portions are very abrupt and precipitous. The ridges and higher parts are characterised by fine open woods, with many noble specimens of the cedar; but the valleys or ravines are often crowded with such an excess of bushes and creepers as to render progress irksome in the extreme.

The view from Tamana (1025 feet) possesses a peculiar charm. It is by far the most comprehensive in the island. The eye luxuriates in every shade of the richest greens; a vast extent of woodland, from eastern to western sea, from northern to southern hills, without the slightest trace of cultivation, save where the scarlet flowers of the "madre del cacao" mark the winding course of the Caroni. Scenery more sublime may be readily obtainable, but for loveliness of hue, for exuberance of vegetation, this is a prospect which can scarcely be surpassed.

The southern littoral range is not so continuous. The slopes of the hills are in the highest degree precipitous. There are no points where prospects can be obtained, the density of vegetation limiting the circle of vision to a short radius.

WELLS AND SAWKINS.—*Geology of Trinidad*. Longmans.

For exquisite descriptions of tropical vegetation of Trinidad see Kingsley, *At Last*. Macmillan.

The Pitch Lake of Trinidad

Our proximity to the Pitch Lake was announced by the fetid smell of the hard black roads, formed of bitumen and clay; and a quarter of a mile brought us to the margin of the lake itself, looking like an immense black swamp, intersected with narrow canals of water, meandering in all directions, and interspersed with clumps of low shrubs, reeds, and rushes.

The whole surface of the lake was hard enough to walk on with perfect impunity, though standing still in any one place for five minutes the heels of one's boots

sank in an inch or so, but in merely walking over it, the feet made no impression whatever. The canals were, in no case that we saw, more than a couple of feet in depth, or four feet in width, averaging much less. They were filled with clear, brown tasteless water.

The area of the lake may be a mile in breadth, by a mile and a half in length. It is oval, and has its boundaries perfectly defined by a belt of forest. The smell is fetid enough. Its depths cannot from the nature of the material be ascertained, but wherever we stood, the slight indentations of the surface were instantly filled with water. There is little doubt that underneath the bituminous exudation is incessantly in action, and that it coagulates on the surface from the influence of the atmosphere.

C. W. DAY.—*Five Years in the West Indies.* Colburn.

In Central America is British Honduras, famous for mahogany. In northern South America is British Guiana, with dense forests and sugar plantations on the lowlands.

British Guiana

British Guiana, the area of which is estimated at about 110,000 square miles, extends from the mouth of the Orinoco and Venezuela on the north to the Corentyn River and Dutch Guiana on the south. Its coast region, which consists mainly of a series of river deltas, is almost everywhere very low—indeed almost invariably below the level of the sea. It is everywhere, except where the hand of man has worked a change, covered by a dense growth of trees, of which so large a proportion are the semi-aquatic, stilt-raised mangroves, or the somewhat similar courida, that it requires a careful eye to distinguish other species. From this low-lying mangrove belt, there is a gradual, at first scarcely perceptible, rise; but, farther inland, the land rises far more rapidly, in a series of terraces, till it culminates in the comparatively high, dry

table-land which, in Guiana, is called savana, and which forms so much of the interior of the continent of South America. In the southern part of the colony this highest line is represented by the Pacaraima, or Parima range, an outlying spur of which is the renowned Roraima. Yet farther south are the Kanaku Mountains. In the north of the colony this highest line is only represented by the lower slopes of the Sierra Imataka range. The limits of British Guiana toward the interior of the continent may roughly be described as corresponding with this line of high land. As these mountains themselves are for the most part bare of forest, so also, near their sources, are the banks of the rivers which spring from them. But gradually, along the downward courses of these latter, the trees begin to gather, at first scattered here and there along the banks, then forming a thin line along the water's edge, and, lower down, broadening into a forest belt with the ever-increasing width of the streams. At last, in some cases a couple of hundred miles from the sea, the tree fringe of one river merges with the tree fringe of the next, and thus is formed one dense and unbroken forest, which covers with its almost impenetrable tangle the whole of the lower land, and finally passes, almost without interruption, though with some slight changes in character, into the half-submerged fringe of mangroves which rise on stilted roots from the sea.

E. F. IM THURN.—*Proceedings of the Royal Geographical Society*
October 1892.

By permission of the Royal Geographical Society.

Roraima

At the foot of the mountain the hilly ground lay in patches of yellow, stony savana, and dark strips of woodland, rising in elevation as they approached its base. Then came a deep forest-clad ravine, whose farther side sloped steeply up to a distance of about 3000 feet, and

springing directly out of this sea of green rose a perpendicular wall of red rock 1500 feet in height. Hardly a shrub broke the sheer descent of the shining cliff; scarcely a hue of verdure marked where clinging grasses had gained a footing on its smooth face. The south-eastern corner was slightly rounded, and its tower-like appearance increased its general resemblance to a Titanic fortification, a few miles in length, rising from a forest glaciis. The level summit line was backed by forest trees which to us appeared like bushes, and from their feet, like skeins of floss-silk swaying in the wind, three waterfalls descended and were lost in the woods below. But towards the northern end of the mountain a magnificent cascade, whose lip seemed to be below the summit, sprang in a broad silvery arch right down into the green depths, barely touching the rocky wall in its descent. This is the source of the Cotinga River. Eventually this river falls into the Amazon, after mingling with the Rio Branco and Rio Negro. Still farther north was another fall, whose waters formed one of the principal tributaries of the Cako River, a tributary of the Essequibo.

J. W. BODDAM-WHETHAM.—*Roraima and British Guiana*. Hurst and Blackett

By permission of Messrs. Hurst and Blackett.

“On ascending the great rivers, which have been happily called ‘the veins of the country,’ we find them covered with verdant isles; and as we approach the primitive forests the landscape assumes the features peculiar to the tropics. Gigantic trees raise their lofty crowns to a height unknown to the European forest. Lianas cling to their trunks, interlace their wide-spreading branches, and, having reached their summit, their aerial roots descend again towards the ground and appear like the cordage of a ship. Clusters of palm trees rise majestically above the surrounding vegetation. Even the surface of the water is covered with a thick carpet of plants interspersed by magnificent flowers. What could better give an idea of the luxuriance and richness of vegetation in Guiana than the splendid *Victoria regia*, the most beautiful specimen of the flora of the western hemisphere? A gigantic leaf, from 5 to 6 feet in diameter, salver-shaped, with a broad rim of light green above and a vivid crimson below, rests upon the water; quite in character with the wonderful leaf is the luxuriant flower, nearly 4 feet in circumference, and consisting of many hundred petals, passing in alternate tints from pure



RORAIMA.

white to rose and pink. When the flower first opens in the morning it is white, with pink in the middle, which spreads over the whole flower as the sun proceeds towards the western horizon, and is generally found the next day of a pink colour. As if to enhance its beauty, it is sweet-scented."—SIR R. H. SCHOMBERGK.—*British Guiana*.

Georgetown

Since the site of Georgetown is so flat, no good view is gained on approaching it from the river. Nothing is seen but low wooden buildings and warehouses, over which in the distance can be seen the towers of churches and the tops of the higher houses, amongst which tower up tall cabbage and coco-nut palms.

The first impression that Georgetown gives, on exploring, is its resemblance to a large garden, rather than a town. The streets are so wide that the beaten track runs down the middle and leaves a broad grass plot on each side. All the houses are separate, and each stands on its little plot of ground, which is usually filled with flowering trees and shrubs and palms, giving a very pretty effect.

The houses are raised from the ground on pillars, to protect the inhabitants from the damp rising from the marshy soil on which they are built. Before each runs a balcony or gallery. White enters largely into the decoration of the outside of the houses, and forms a pleasing contrast to the green of the abundant foliage.

J. AMPHLETT.—*Under a Tropical Sky*. Sampson Low.

By permission of Messrs. Sampson Low.

WEST AFRICA

In Africa Britain has several tropical colonies round the Gulf of Guinea. The largest towns are Freetown, the capital of Sierra Leone, and Lagos, in Nigeria. Nigeria, in the basin of the Lower Niger, is a typical West African region.

Scenery of the Niger

The delta has a length of about 80 miles, and presents a repulsive aspect. In its southern part, where it is in the first stage of becoming land, there is nothing but slimy mud grasped by the mangroves, which prevent its being washed away into the ocean. The atmosphere reeks with pestilential odours.

Hardly a sound breaks the death-like stillness which prevails, unless it be the ear-piercing shriek of a parrot, or the equally shrill bark of a monkey, while almost the only other sign of life to be seen is the kingfisher in rapid flight along the surface of the river. In this vile region man finds it impossible to live. It is only towards the apex of the delta that he can venture upon waging war with Nature with the slightest hope of wresting from her the wherewithal to live. In this latter part a rich and golden crop of palm-oil nuts tempt the almost fever-proof natives to brave the malaria and all the discomforts of an annually overflowing river.

But though I depict the delta in these uninviting colours, it must not be supposed that these would be the impressions acquired by the traveller steaming up the river. The river, shaded by its canopy of trees, and winding in sharp silvery curves, presents to him many a pleasant picture. Let him land, however, and soon would he be disillusioned. Tangled bush would meet him in the face. This he might perhaps penetrate, but only to find himself surrounded by an under forest of weird aerial mangrove roots; while at each step he would sink in slimy ooze, from which would bubble out malarious and malodorous gases. Myriads of mosquitoes, disturbed in their gloomy resorts, would settle on him, and drive him distracted by their bloodthirsty attacks.

On leaving the delta and entering the second region, a brighter scene meets the eye. We now steam into the broad bosom of the undivided river. No longer con-

fined to a leafy tunnel, we breathe with pleasure the river breeze that daily stirs the water into ripples, and tempers the excessive heat of the sun.

Here are arboreal growths of great size and beauty, and of all conceivable forms, from palms the most graceful and feathery to trees so densely foliaged that no ray of the sun passes through. Numerous clearings tell of a successful war with Nature. Villages peep from the protecting shadow of the forest, and groups of scantily clothed inhabitants pausing in their various primitive occupations watch our progress up the river. Children, naked as the day they were born, dive or swim, with much fun and splashing, near the banks, while gliding along before us to plantations are numerous small canoes propelled by paddles. In less frequented parts, the river is made interesting by the sight of crocodiles lying like stranded logs at the edge of the water, or of hippopotami, now sunning themselves on the banks, anon, for greater safety, showing nothing but their heads in some deep back-water of the river.

This middle zone, 140 miles in length, is flat over the greater part of its area, gradually, however, passing into low undulations, as it approaches the interior plateau. Towards the south the country is flooded when the Niger is at its highest. The soil is sandy, and not rich in fertile ingredients; but from the superabundance of heat and moisture, plenty of food is obtained with little toil, this district being specially famous for its splendid yams, the staple food of the region.

Towards the northern limit of this middle zone the country begins to undulate, rising here and there over 100 feet above the level of the river; the trees, growing in less favourable conditions, rarely reach the magnificent development which obtains farther south.

These changes usher in a third zone of our river journey. At a distance of about 200 miles in a straight line from the coast the land suddenly springs into a series of bold picturesque mountains, which form the command-

ing outworks or escarpment of the inner low plateau region. Through these mountains the Niger finds its way by a narrow, veritably adamant gateway. Like huge pillars on either side rise isolated peaks and table-topped mountains, grand in their defiant barren ruggedness, graced by pliant creeper and dark-foliaged shrubs. The river channel itself, as if to render further advance impossible, is studded with small islands and hidden rocks, round which the river sweeps and swirls in fierce currents. Under careful pilotage this dangerous part is safely breasted, and, as the shades of evening fall rapidly over rocky hill and river reach, we steam into the lake-like expanse formed by the confluence of the Niger with its great eastern tributary the Benue, at Lokoja.

In passing through this rocky and dangerous barrier we leave behind us the coast regions, and enter the Central Sudan; and the changes which occur are striking in the extreme. We exchange the mangrove swamps and flat alluvial plains, but recently a plateau region carved into deep valleys, rugged peaks, or picturesque mountain ranges. Instead of the primeval forest with its majestic trees, evidence of a young and virgin soil and congenial climate, we are now surrounded by more stunted and gnarled growths, indicating a drier climate and more arid soil. The palm-oil tree has practically disappeared, but, for purposes of trade, is replaced by a tree of almost equal value, which supplies the shea-butter of commerce. Sorghum or Kaffir corn, along with maize, supply the natives with their chief food instead of yams, while cattle, sheep and goats, horses and donkeys, become important.

But it is in the people themselves that the most remarkable differences are noticeable. A denser population, a soil which is less productive, and a climate less adapted to luxuriant tropical growths, but much more healthy and exhilarating, have combined to make the struggle for existence more difficult, with the result of developing a higher type of man. Behind us are the unwashed, barbarous, nearly naked tribes of the coast

region ; before us lies a people astir with religious activity and enthusiasm, and wonderfully advanced in the arts and industries. Mohammedanism has a great influence for good in these semi-civilised regions of the Central Sudan. It supplies the tie which binds a hundred alien peoples together, and which is rapidly transforming the whole political aspect of Africa north of the line.

JOSEPH THOMSON.—*Scottish Geographical Magazine*, 1886.

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Among the economic products of Nigeria are the oil-palm, rubber, and the kola-nut. The cultivation of cotton is increasing.

Economic Products of Nigeria

Coffee will grow well anywhere, especially in the clearings of the virgin forest. Cotton grows wild throughout the greater portion of the Niger basin, and in the time of the American war a large quantity was shipped by way of the Gold Coast and Lagos. It is also sent home periodically at present ; but the indolence of the negro prevents the development of a prosperous industry, for, as he cannot be induced to undertake systematic care of the bushes, the staple is short and brittle. The Moslems of the hinderland cultivate it carefully, and, weaving it in quaint but ingenious handlooms, send down a beautiful fabric dyed blue to the factories, as well as northwards across the desert. Almost as far as the Nile, and certainly in Southern Morocco, the blue haiks and burnous of the semi-Arab and Moorish tribes are the products of craftsmen in Kano and Sokoto, and this "country cloth," as it is called, is worth much more along the coast than any turned out in Manchester.

There are precious gums of many kinds, from copal, unequalled as a body for varnish, to acacia, gums, and frankincense. These do not, as a rule, come out *via* the delta, but from the higher waters through Sierra Leone, or

southwards across the Gold Coast hinterland. Senegal, especially, ships large quantities of precious gums obtained from near the source of the Niger.

Then there are the dyes, the bright orange-red barwood, and the beautiful yellow-pink camwood, besides split pieces of ebony. The trade is crippled by the negro's distaste for labour, and timber-cutting is no child's play in the tropics. There are great mahogany forests which lie idle through dearth of hands to work them, although now the Gold Coast ships this wood, notably from Axim. Indigo grows wild in many places, in the shape of a woody creeper.

The wonderful properties of the kola-nut are beginning to be appreciated at home, and this tree may be found every here and there along the Niger. All these products of the Niger region, with many others as well—such as ginger, ground-nuts, copra, gold dust, and feathers—are largely exported from its upper waters *viâ* Sierra Leone, the Gold Coast, and Senegal, or from the other end through the Lagos colony and the Niger Coast Protectorate. Before all of these, however—and probably destined to become more valuable than the present staple, palm-oil—is rubber.

HAROLD BINDLOSS. — *In the Niger Country*. W. Blackwood.

By permission of Messrs. W. Blackwood and Sons.

Rubber

A Lagos rubber forest is a striking sight. The creepers, many of whose stems are almost as thick as a man's leg, crawl and plait themselves like twining serpents about the trunks of the trees, hang in festoons from their mighty limbs, and wind in knotted tendrils about the buttressed roots. Their dark green glossy leaves, closing the openings between the branches, shut out the light of day and wrap all below in dusky shade, while the rank odours and smell of steaming earth are almost overpowering. Here and

there are clusters of pure white star-cupped flowers, or bunches of fibrous shelled fruit resembling an orange, whose inside pulp is sweet, with an acid sweetness, and tolerably palatable. There is, however, something unwholesome about the rubber vine, and I have heard the native gatherers say that where it flourishes the black man dies; while, with the exception of troops of chattering monkeys, who delight in the fruit, it is seldom that the silence of a rubber forest is broken by bird or beast.

HAROLD BINDLOSS.—*In the Niger Country.* W. Blackwood.

By permission of Messrs. W. Blackwood and Sons.

This volume is full of graphic descriptions of West African scenery

The Oil-Palm

The nuts grow in clusters beneath the fronds of the oil-palm, which, in that part of Africa lying between the Cameroons and Senegal, only grows within a certain distance from the coast. Once the land becomes drier the oil-palm disappears. In the Niger region it is rarely met with more than 150 miles from the sea, while in Lagos the boundary is considerably less than half that distance. The whole fruit in appearance is something between a pine-apple and a gigantic fir-cone with the interstices filled in; and this outer cover contains many "nuts," each resembling a yellow plum more than anything else. The skin is soft and silky, tinted gamboge and vermilion, and beneath it there lies a mass of fibre and yellow grease. The bushman either scrapes this away or stamps the whole up in a foot mortar, and the pulp is boiled; when the grease rises to the top it is skimmed off, and becomes the best palm-oil. Then there is still left an inner shell something like a walnut, which is cracked, and the two or three little black kernels it contains are flung into another calabash. These kernels are shipped to Great Britain and the continent in millions

of tons, and in Hamburg and Antwerp are pressed for an oil inferior to the outer layer.

H. BINDLOSS.—*In the Niger Country.* W. Blackwood.

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The Kola-Nut

The kola-nut far surpasses in importance every other article of commerce throughout the whole of the Western and Central Sudan. Though not found originally in any part of the Hausa States, there is no village, however small or remote, in which it is not constantly used. It is the product of a tree which is found in greatest perfection in the country to the back of the Gold Coast colony. The fruit resembles a large-sized chestnut, and is encased in long pods, each containing four to six nuts. It grows like chestnuts, in bunches of three or four on the tree. Round the kola-nut there is usually a black line, sometimes two, at which it can be divided or subdivided. The colour is generally brick-red, there are all sorts of intermediate shades between red and white. The kola-nut plays an important part in private and public life. The colour in this case has a special significance. A white kola is a sign of friendship and hospitality. Proposals of marriage, acceptances or refusals, defiances, declarations of war, etc., are conveyed by the sending of a number of kolas of the prescribed colour. The most minute care and attention is necessary in order that the kolas may reach the market in good saleable condition. They are carried in baskets, each of which contains three or four thousand kolas, while two of them form a donkey load. During the march the nuts are packed in baskets and covered with fresh green leaves. Every four or five days they ought to be repacked, in order that the leaves may be renewed, and that the nuts which are touched with mildew may be removed. If treated with care, the nuts may be preserved fresh two or even three years ; but they

must be kept constantly damp. If exposed to the air and allowed to dry, the kola opens along the black line mentioned above, wrinkles, and becomes as hard as wood.

CANON C. H. ROBINSON.—*Hausaland*. Sampson Low.

By permission of Canon Robinson and Messrs. Sampson Low and Co.

The Sudan peoples are intelligent and skilled in many arts. Their trade is considerable.

A Sudan Trading Town

The market of Kano is the most important in the whole of tropical Africa, and its manufactures are to be met with from the Gulf of Guinea on the south to the Mediterranean on the north, and from the Atlantic on the west to the Nile or even the Red Sea on the east. Any one who will take the trouble to ask for it will find no difficulty in purchasing Kano-made cloth at towns on the coast as widely separated from one another as Alexandria, Tripoli, Tunis, and Lagos. The market-place of Kano is probably the largest in the world. It is the great meeting-place of traders from almost all parts of Africa north of the equator and west of the Nile valley. The Tuareg of the desert comes in touch here with the natives of Adamawa and the south; the Arab merchant meets here with traders from Lake Chad on the one side, and the Niger or even the Atlantic sea-board on the other. Here, too, are to be seen Mussulman pilgrims from far and near, on their way to and from Mekka. The walls of the town, which are kept in very fair repair, are 15 miles in circumference and are entered by thirteen gates. The principal occupation of its inhabitants consists of the weaving of cloth from native-grown cotton, and in manufacturing it into garments of various kinds. Kano clothes far more than half the population of the Central Sudan. The greater part of this cloth is dyed blue, the native indigo, which grows wild all over the country, being used for this



SUDANESE HOUSE.

purpose. The most important article of commerce in the Kano market, on the supply of which the prosperity of the town to a large degree depends, is the kola-nut.

CANON C. H. ROBINSON.—*Geographical Journal*, September 1896.

By permission of Canon Robinson and of the Royal Geographical Society.

EAST AFRICA

Lake Victoria Nyanza lies on the equator, in **British East Africa**. The most fertile part of **British East Africa** is **Uganda**.

Lake Victoria

The largest of the lakes of Central Africa—the Nyanza—covers an area of about 27,500 square miles, and is thus about the size of Scotland. Its banks are formed of grassy hills sloping gently to the shore, or of rugged stretches of rock soon giving place to higher mountain ranges or plateaus. The shores of the north, west, and south, along the lake from Uganda to Mwanza, display the character of a hilly country with occasional weather-worn cliffs; while in the south-east, east, and north-east we can speak of actual ranges of mountains or extensive plains.

The shores themselves abound in bays large and small. The shallow water in the bays has generally a dull, dirty colour, and is traversed by broad stretches of dense papyrus, the haunt of numerous hippopotami and crocodiles. Where a brook or stream enters the lake, there is found around the mouth a singular mud swamp, and it is by no means one of the pleasures of life to pass through a fœtid swamp among papyrus stems 20 feet high. On one who stands on the shore of the lake, and allows his eyes to range over the broad expanse of blue water, the Nyanza produces an impression similar to that of the ocean.

Of the larger islands which lie along the shore we must mention the Sese archipelago, with its principal island of the same name; Uvuma, belonging to Uganda, and Ukerewe, in the south; and we should perhaps add Ugingo, in the east. Besides these islands, there is a broken chaos of small islets near the coast, some of them inhabited, some only serving temporarily as camping-places for fishermen, or travelling natives. On one island we find dense, impenetrable primæval forest; another shows us fresh, green meadows, extensive fields without a tree; and a third consists of blocks of stone piled one upon another, in the crevices of which various kinds of underwood grow in rank luxuriance. It is a charming sight that these islands generally present, with the dense, dark green of the giant forest and the low, tangled underwood, the shore formed of blocks of stone of dazzling whiteness, and the foam of the blue waves dashing high upon them.

LIEUT. P. KOLLMANN.—*Victoria Nyanza*. Sonnenschein.

By permission of Messrs. Swan Sonnenschein and Co.

Uganda

Uganda is without question the most fertile and productive territory on the Victoria Nyanza. In its southern portions, bordering on the Nyanza, the interior exhibits the type of a hilly country. Gentle slopes covered with green grass, or with dense bush and forest, traverse the land. The valleys are moist with frequent showers, and thus form the best soil for the chief object of culture, the banana. Towards the German territory the undulating landscape passes into extensive steppes of underwood, till, in the north of Kisiba, ranges of heights again make their appearance. It not seldom happens that a surging mist settles for days together in the valleys; but in spite of the great moisture of the soil and the dampness of the air, Uganda is considered healthier than other Nyanza districts.

The chief occupation is agriculture. In Uganda they especially cultivate different kinds of bananas, beans, sugar-canes, sweet potatoes, and many other vegetables which are taken as condiments to bananas, and coffee. The banana thrives there in splendid luxuriance. Large and beautiful groves cover the green, undulating land, among which the villages, often of considerable size, lie hid.

For the native the banana means almost life or death. He cooks it when unripe in large earthen pots, which are covered in with banana leaves. He roasts it at the fire; crushes meal from it; uses the fibre for all kinds of wicker-work, and for tying up and fastening his work; the leaves serve him as table-cloth; from the viscous sap of the trunk he prepares a kind of soap; and a valuable drink, something like lemonade, is obtained from the fruit, of which there are not infrequently 150 to 200 in a single cluster. If he lives in good circumstances the Mganda¹ likes to eat meat either boiled or grilled over the fire. He either builds himself a framework of bars like a grate, on which he lays the pieces of raw meat, or he runs a slit through them and sticks it in the ground before the fire. The lake supplies an abundance of savoury food in the form of large and savoury fish, and the Mganda also eats locusts and white ants fried.

Boat-building is a matter of special importance to the Waganda, and they have brought it to great perfection. Though frail in appearance, a single canoe can hold as many as 100 men. Uganda is so far favoured that the most suitable wood for boats grows there, while in the other shore districts of the Nyanza scarcely any forest trees flourish except poor, stunted specimens. The Waganda venture out on the stormy lake against wind and weather, and urge their boats through the high waves, singing monotonous songs. When lake and wind are calm, their boats, driven by rhythmic strokes of the oar, can be seen shooting along with the speed of an arrow. Not a single nail or other article of metal is

¹ Mganda=sing. : Waganda=plur.

used in fastening the separate parts of the boat and binding them to one another, but all the pieces are sewn together. Thin, white wattles serve as thread.

LIEUT. P. KOLLMANN.—*The Victoria Nyanza*. Sonnenschein.

By permission of Messrs. Swan Sonnenschein and Co.

The two most important places on the east coast are Mombasa on the mainland, the terminus of a railway to Lake Victoria, and Zanzibar, on an island of the same name, famous for its cloves. Zanzibar is an important trading and shipping centre.

CENTRAL AFRICA

Between the Congo and the Zambezi is the British Central African Protectorate and Northern Rhodesia.

The Shiré Highlands

The natural route to British Central Africa is through the Chinde mouth of the Zambezi, up that river for about 150 miles, and thereafter for about 160 miles by its tributary the Shiré to Katunga's and Chikwawa, near the foot of the Murchison Cataracts. There is a long portage of between 60 and 70 miles before navigable water is again reached on the Upper Shiré. Transport on the rivers in British Central Africa is accomplished by flat-bottomed, stern-wheel steamers and barges, and on Lakes Nyasa and Tanganyika by screw steam-vessels of slight draught. Land transport is almost entirely confined to native carriers.

Blantyre, the commercial capital of British Central Africa, is situated in the Shiré Highlands, at an elevation of about 3400 feet, nearly midway in the portage between the Lower and Upper Shiré rivers. The Shiré Highlands are well wooded, and the rainfall has usually proved ample for the various cultivations pursued. At an

elevation suitable for most tropical and sub-tropical plants, and with a rich soil, its products, both indigenous and introduced, are very varied. Amongst others the following are found growing wild: chillies, cardamoms, coffee, and indigo. Rubber, from the *Landolphia* creeper, has of late years proved a valuable and large source of revenue. The natives cultivate large gardens of maize, millet, cassava, numerous varieties of beans and peas, sweet potatoes, yams, etc. Some years ago the Cape gooseberry was introduced, and this most excellent fruit now grows wild all over the bush, as does also the tomato. Those two plants in fact take the place, in any neglected spot, of the common nettle in this country. The castor-oil plant also grows in a wild and semi-wild state, and is found a great nuisance in the coffee estate, owing to its persistent vitality. The banana of the country is so very creditable and prolific that its cultivation is left almost entirely to the natives, though it is employed to form avenues on coffee estates.

P. ROBERTSON.—*Scottish Geographical Magazine*, April 1900.

By permission of P. Robertson, Esq., and of the Royal Scottish Geographical Society.

British Central African Protectorate

The chief value of the British Central African Protectorate, compared to the adjacent countries, lies in the great proportion of high land over low and swampy country. The result of this elevation is a much cooler climate than is usually found in Central Africa so near the equator. Unfortunately it is impossible to reach this delectable land from the coast without traversing the hot and unhealthy valleys of the Zambezi and Shiré, and within the Protectorate itself one must at times descend to the shores of Lake Nyasa, or the marshy land round Lake Chilwa, and thereby receive the germs of malarial fever.

The great attraction of this country lies in its beautiful scenery, in its magnificent blue lakes, its grand mountains, its golden plains, and dark green forests. A pleasant and peculiar feature of the western part is the rolling grassy downs, covered with short turf, quite healthy and free from the tse-tse fly. These, no doubt, will in the future become colonies, in which Europeans can rear their children under healthful conditions. As an illustration of our mountain scenery let me take Mlanje, a mountain mass which in its highest pinnacles just reaches 10,000 feet. At the base of Mlanje there are many streams and a wealth of vegetation, among which may be seen the beautiful rafia palms and the wild date. Ascending through this dense tropical vegetation, one enters upon a rolling slope covered with high grass, about 6 feet high, with stems stout and strong, through which at times it seems almost impossible to force one's way. Then comes a belt of tree-ferns, more lovely perhaps than any other form of vegetation. There are breaks and open glades between the rows of tree-ferns and the witch-hazel forests, which are a red gold with flowers of various compositæ, or, in the shadier parts, magenta with the innumerable balsam blossoms. Then one has done with the lower slopes, and is face to face with an abrupt rocky wall, which is quite a difficult bit of Alpine climbing, rendered more difficult perhaps by the desire to contemplate to the full the blue masses of lobelia and the red wax flowers of the aloes which grow out of the crevices of the rocks. One last frantic scramble, holding on by roots of grass, lands one on the top of a ledge. Far away stretch rolling grassy plains seamed with the course of streamlets, and diversified by handsome clumps of temperate forest. This is the upper plateau of Mlanje, a little world in itself, with the exhilarating climate of Northern Europe. The plains and valleys are gay with blue ground-orchids, with a purple iris, and with yellow everlasting flowers. Out of these elevated plains, again, rise other mountains, gloomy in aspect, and remarkably grand in outline. As

one walks about on this tableland, and occasionally reaches the edge, an awful yawning gulf will reveal itself, and the eye, after getting accustomed to the abyss, can make out the whole country below spread out like a faint map. The whole mountain mass of Mlanje probably occupies, with its outlying peaks connected by saddles, an area of 1600 square miles.

Now, as a contrast, let us in imagination walk over one of the great plains, such as border the river Shire along portions of its course, or lie along the salt lake, Chilwa, or on the western shores of Lake Nyasa. By the water's edge, or at intervals over the plain, are dotted groups of acacias and fan palm. The rest of the plain is high grass—in summer it is like a waving grass-sea, with the white plumes of the reeds seeming to be flecks of foam. At this season these plains are almost impassable, except along the beaten tracks, but for seven months in the year the grass is either burnt down and reduced to blackened stumps by the bush fires, or dries up into a golden straw which permits of freer movements. Among these great tufts of yellow grass the tawny lions lurk, and when one is crossing these plains in pursuit of game it is by no means an uncommon incident to put up a lion. Under the sparse shade of the acacias or the palms the black buffaloes will stand, chewing the cud, and whisking off the flies with their tails. Zebras, hartebeests, water-buck, roan antelopes, may be found in numbers. The rhinoceros still ranges over these plains, and wallows in the stagnant pools of the half-dried rivers. The heat prevailing on the plains in the summer-time is very great; but in the winter and spring the air is exhilarating, and in the latter season the thick rich scent of the acacia is a joy to the senses not to be forgotten.

It is an abrupt change from such a scene as this to pass into one of our European settlements. Here will be seen clear broad level roads, bordered by handsome avenues of trees, and comely red brick-houses with rose-covered verandahs peeping out behind clumps of ornamental

shrubs. The natives who pass along are clothed in white calico, with some gaudy touch of colour superadded. A bell is ringing to call the children to the mission school. A planter gallops past on horseback, or a missionary trots in on a fat white donkey from a visit to an outlying station. Long rows of native carriers pass in Indian file, carrying loads of European goods, or a smart looking policeman, in black fez, black jacket and breeches, marches off on some errand. You will see a post-office, a court of justice, and possibly a prison; the occupants of which, however, will be out mending the road under the superintendence of some very smart policemen of their own colour. The most interesting feature in the neighbourhood of these settlements at the present time is the coffee-plantation, which, to a large extent, is the cause and support of our prosperity.¹

SIR H. H. JOHNSTON.—*Geographical Journal*, March 1895.

By permission of Sir H. H. Johnston and of the Royal Geographical Society.

AFRICAN ISLANDS

The islands of Ascension and St. Helena off the western coast of Africa, and Mauritius and other islands off the eastern coast, are also British. The vegetation and products of all are tropical.

¹ Condensed. The article is exceedingly graphic throughout and should be read in its entirety.

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